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Is Moses Scientific?

First Chapter of Genesis Tested by Latest Discoveries of Science

BY

REV. P. E. KIPP

"Thy word is true from the beginning "Ps. 119; 160.
"Let all the nations be gathered together, and let the people be assembled; who among them can declare this, and shew us former things? let them bring forth their witnesses, that they may be justified; or let them hear, and say—It is truth" Is. 43:9

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PREFACE.

The apology for this book is the crisis of the times. The Old Testament, and especially the Pentateuch, is now receiving the brunt of battle, which thirty or forty years ago was waged against the New Testament. There seems to be such confusion and smoke, that the common people begin to fear there must be more mistakes in the Bible, than it is to the interest of Christian scholars to let them know. If so much is told out loud, how much more must be concealed? If the books of the Old Testament are unauthentic and unhistorical, the foundations of their faith seem slipping away, and they are left in bewilderment to know whether anything can be firmly believed.

The age is passing through a peaceful revolution; old methods of living, traveling, working, thinking, believing are undergoing change.

If we could read the history of our own times, as it shall be written fifty years hence, we could not believe that we had been on the stage when such great revolutions were in progress.

In the religious world, as elsewhere, it is a

time of crisis; old faiths need to be restated; old truths need to be set in new relations; old theology needs to be rearranged around new centers. The greatest care should be exercised, lest in proving all things, we should not hold fast that which is good. Re-adjustment does not mean relaxation; restatement does not mean rejection. If on the one hand, we find that our old diamonds need new setting, let us be careful that we shall not have the setting, without the diamonds. And if on the other hand, the old tree is sloughing off the effete bark, it is because it is so healthy and vigorous, but let us not clutch after the cast off wood, and despise the new growth.

The people need to be assured that there is no more danger to the old Book than there is danger to the tree, when Spring splits off the old bark. The old truths are not going to be given up for they are embedded in the life of the world; like the granite rocks, they underlie all our beautiful civilization which grows above them.

But at just this time, when doubts are raised and controversies fill the air to suffocation, it was thought opportune to look at the bulwarks which have been thought most easily assailed.

The Pentateuch is most violently attacked, but if any part is exposed to the hard facts of rigorous science, it is the first chapter of Genesis. There, if anywhere a deadly battle can be fought; there, if anywhere science is sure of its ground and can make a strong attack.

Much that is put forth as historical criticism is mere speculation. Much of what is hurled against the Pentateuch are missiles that are forged out of fancy and imagination. The mist in which the long distant past is enveloped; the clouds which obscure most of what we call earliest history, have been rolled up into airy cannon-balls and hurled against the beetling rocks of the Bible.

But in the first chapter of Genesis, this is not so; here positive science comes to the front; here she stands on rock and speaks of what she knows. On some things in that chapter, science can speak with as much assurance as can revelation. If there be a conflict here, it will not be conducted with missiles of mist, but with the cold steel of well tempered facts. So that if anything be the matter with the Bible, here is the place to find out. Science has picks and bars with which she can lay bare the foundations of Scripture to show us upon what it is founded.

The excuse for this book is, therefore, the need of the times. The attempt has been made to bring out the whole truth of this chapter of Genesis and the whole truth of science upon the same subjects, and place them side by side. If Scripture be true, it must be willing to be tried by the most rigorous tests, wherever such tests can be applied; it must ask for no favor and no screen. Truth should always be willing to stand forth naked and she need not blush. If we ask for one concession for the Bible; if we attempt to cloak its errors; if we apologize for its untruth by the specious plea that the Bible was not given to teach science, we are no friends of Truth. Truth scorns human cloaks; it cannot abide human patronage; it is but fettered when we would throw around it the arms of our protection. If it cannot stand out in the glaring light, it is not Truth, but a half truth, which is the worst counterfeit of all. On most of the subjects of Revelation, Science is not competent to speak, because the facts relate to a realm where she cannot enter; but on this first chapter, she can speak with authority. If we run to hide our Bible from her keenest search; if we piteously beg for quarter, where we fear it is vulnerable, we impeach our own faith. About the contents

of this chapter, Revelation and Science are both positive; if they come into conflict, the battle must be fought out and the sooner we learn the issue, the better for us.

The writer does not claim to be a scientist. On this side he has taken for his authority such men as Principal Dawson of McGill College Montreal; Prof. Dana of Yale; the late Prof. Winchell of University of Michigan; Prof. Warring of Poughkeepsie; the late Prof. Guyot of Princeton; Prof. Wright of Oberlin; Prof. Le Conte of the University of California, and others equally eminent who have brought the story of science down to date.

On the other side the writer has taken the record in the original language and with Hebrew lexicon and concordance has attempted to learn what it really does say. He has relied on no tradition nor even translation, but has sought to know what each word means in its derivation, and in the use that is made of it in other passages of Scripture. No reconciliation has been attempted between Revelation and Science, for reconciliation implies enmity; what we want is fullest agreement, or nothing.

Perhaps the confession should be frankly

made that this special study was begun with considerable trepidation, lest wide differences should be met where the two could not be brought into fullest accord. Many men of eminence, who believe in the inspiration of this record, have yet apologized for the unscientific statements which this chapter was thought to make on minor points. If this be the case, then the record is not scientific, and we had better not advance the claim. But the increasing delight, and astonishment as the points of difference disappeared by a close study of the record, cannot be told. As the angel conducted John through heaven, so Science seems to walk through this garden of Revelation to point out its marvels and surprises, and then explain them in a language familiar on earth.

Condensation has been studied. The age no longer reads voluminous works; it requires of him who would preach or teach, that he shall gather from a wide range, but shall put it within a small compass, for "Art is long and time is fleeting." Technical discussion and terminology have been avoided as far as possible.

It was for some time a question whether references to the scientific authorities should not

be constantly made by foot-notes; but it was found that these would be so frequent as to be confusing, for often the same sentences would have a reference to several authors, and it would have necessitated an entire change of style, which is now more of a story from the side of science, illustrating the great truths of the text.

The question of authorship, has not been entered upon. Popular use, and even the authority of Christ, have assigned the name of Moses to this part of Scripture, and no change has been made in this respect. It may be objected that Moses himself, or whoever else was the author, never dreamed of what is supposed to be found in this chapter. It is not meant that this chapter is scientific, in the sense of a text book, nor that its terms and classification are those of modern science; but that it contains the germs, which in the future should develope into a tree of knowledge, as the acorns, once scattered over the ground, have developed into the great forest. Moses did not himself realize what his word contained, because they contained expansive ideas, which should mean more to him who knows more about the subjects to which they relate. And this is proof of the inspiration

of this chapter, in that it contains more than any one of that early day could possibly have known, and requires all the science of today to unfold.

If this be a revelation, it should be expected as a matter of course, that far more was contained than could be comprehended by any man, for the communication was made, not to his understanding, but to his faith. If this be God's truth, it should mean more to an advanced age than it could mean to one of less knowledge, just as the heavens, which have always declared the glory of God, must tell more of that glory to the age which has telescopes than to that age which had none. But the depths of this wonderful chapter have not yet been sounded; it will mean far more to the next generation than it can mean to us, if that generation be more enlightened in the wisdom of God.

Cleveland, 1893

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IS MOSES SCIENTIFIC?

CHAPTER I.

PROLOGUE.

"In the beginning God created the heavens and the earth."

The first chapter of Genesis is prophecy turned backward. It cannot be history, for it reaches back before man was, before the earth was, yes before time itself began to be.

On such adventurous flight, imagination would not venture forth alone. The trembling seer must have been encouraged and borne across the measureless distances by other than human power.

These twinkling points, which he shows us in the depths of the past and which form this galaxy of Genesis, are they real stars, or are they only the after-glow of the distant fires kindled by some sagacious man primeval?

We are children of eternity; we are soon going out into the limitless spaces and we want to

know whether we can trust prophecy turned forward.

And these other lights twinkling in the depths of the future and forming the far more brilliant galaxy of the Apocalypse, which closes our Bible, are they too, real stars by which we can guide our course, or are they only the phosphorescence of human genius?

We are going out where living man has never been, where earth shall not be, yes where time shall be no more. All that we have to relieve the darkness of the two eternities is this Word.

Does it tell us true what shall be? We can better trust it, if it be shown that it told us true of what has been.

The first chapter of Genesis is necessary to the last chapter of Revelation. How dare we believe in the river of life and the city that hath foundations, if we cannot believe what the Word has told us of the beginning, the light, the air, the earth and its peopling? It is not sufficient that the first chapter of Genesis be fairly true; true in a general way; we require that all its statements shall be wholly accurate.

Is Moses scientific? does his record square with what science can vouch of the past? So far as science can follow him, we dare not relieve

him of the strictest accountability. He has gone out of his way to tell us of things which in no way concern our salvation; things which should not have been told unless absolutely true; but science is true, and therefore he has no right to ask to be screened from the responsibility of scientific accuracy. These facts could not have been known by the writer; they cover ground which human knowledge had not then begun to traverse; if known at all, it must have been by divine inspiration. While the language may be liable to the imperfections of a human vehicle, yet the great facts themselves should not need the slightest apology, for this would not be a question of human, but of divine errancy.

This cosmogony involves the credibility of the Book which has disclosed to us the way of life, and we insist upon having everything connected with our salvation so sure, that nothing can suggest a doubt. It is not sacrilege then that we should ask science to remove the soil so that we may see if the foundations are built upon the bed rock. The places on which rest the two ends of the rainbow will not bear scrutiny, but the viaduct to heaven should not fear to allow science to lay bare the base and examine the pier on which its earth-end is secured.

This record can claim to be divinely inspired only because its statements are scientifically true; if they are partly true and partly false it can be nothing more than a shrewd speculation. "It is a flippant remark to make in this connection," says Principal Dawson, "to say that Scripture was not given to teach science." While this is true, it does not apply here; the information here offered is wholly gratuitous; not necessary "to make thee wise unto salvation," so that we have a right to expect it shall be accurate information.

In his "Intellectual Development of Europe," Dr. Draper tells us what a revelation should be able to do. He is speaking of the Koran, and says: "Considering the asserted origin of this book, indirectly from God himself, we might justly expect that it would bear to be tried by any standard that man can apply, and vindicate its truth and excellence in the ordeal of human criticism. As years pass on and human science becomes more exact, more comprehensive, its conclusions must be found in unison therewith. When occasions arise, it should furnish us, at least the forshadowing of the great truths discovered by astronomy and geology, not offering for them wild fictions of earlier ages, the inventions of the infancy of man."

Though intended as a back thrust at the Bible, by setting up a test which he thought could not be fulfilled, we will accept this as a just demand, and we are willing to test the first chapter of Genesis by it, and admit that if it cannot meet it, then this chapter has no right to ask us to believe it is inspired. If this be a part of God's Book, it must be true, and truth asks no favors at our hands; we need not run to hide it from the severest investigation by whomsoever made. If there be a conflict between Revelation and Science, Truth cannot be on both sides; it must be on the one side or the other,

> "And truth the day must win
> To doubt would be disloyalty;
> To falter would be sin."

If Revelation and Science be antagonists, a conflict is inevitable; by all the efforts of the friends of either side such conflict can no more be avoided than it can between light and darkness.

In this chapter Revelation has deliberately come down into the domain of science, and so has made this a legitimate field where they may meet, nay must meet. Here they must fight to the death if they be foes; but if it be found that their supposed differences have been false accu-

sations brought by the indiscreet followers of each against the other, they will come forth from the meeting firmer and faster friends, because of their mistaken enmity.

Even so eminent a scientist as Dr. Draper insists that there is such an enmity, and he has written a "History of the Conflict between Religion and Science." If however we insist upon the definition of terms, we shall see that no such conflict is possible. Religion is the fulfillment of our obligation to God and to man, and to this, science can make no opposition.

No, it is answered; it is not with religion that science has a conflict, but with the Bible. If we again insist upon bringing the charge down from its cloudy vagueness, and ask where that conflict lies, we shall find that it is not with the Bible either, but with the church, or theology, or tradition, or superstition. But the church is not the Bible, for it has often misrepresented the Bible; theology has often made a conflict when none existed; tradition may be wrong. Like Job's three friends, these may have gotten the cause they championed into a false position, and yet the Bible be true, as the heavens have always "declared the glory of God" even though astrology and many theories of the heavens were wrong.

"Science interpreted is theology; science prosecuted to its conclusions, leads to God."

The place therefore where the relations between Revelation and Science, will be strained, if anywhere, will be on the field opened by the first chapter of Genesis; we are to enter this field and see if even here they do not dwell in complete accord.

Whence came this chapter? Higher Criticism thinks it finds evidence that it was written by a different hand than that which wrote the second chapter. This conclusion may be correct, for it is probable that Moses found this record already to hand, and he had but to incorporate it into the body of his writing. Whether this revelation was made to Moses or Abraham or Noah or even to Adam and handed down by oral tradition, matters not; it has been incorporated into the sacred writings, and Christ has given to it the authority of Moses' name.

That this document could have been handed down in writing from even a much earlier age, is now quite certain, for writing is known to have been in existence long before the time of Moses.

In a recent article Prof. Sayce of Oxford describes what he calls the "romance of archæology." Dr. Flinders Petrie has discovered at

Tel-el-Amarna in Egypt, tablets which give us a gimpse of the social and political life in Canaan, a century before the Exodus.

Among these letters written in the cuneiform characters of Babylonia, was one from Zimrida, the governor of Lachish in Palestine, to Pharaoh. Two years ago Dr. Petrie undertook excavations in an artificial mound in southern Palestine, called Tel-el-Hesy. Called away himself, he left the work to be prosecuted by Mr. Bliss, who unearthed at the very close of the work, a small clay tablet also in cuneiform characters similar to those of the letters which had been exhumed down in Egypt, at Tel-el-Amarna. When this tablet was read it was found to contain the name of this governor Zimrida, who had written the letter to the king of Egypt, and it refers to a time a hundred years and more before the Exodus.

For more than 3,000 years the letter which Zimrida had addressed to Pharaoh, and the letter which he had read at home, had been lying beneath the ground, the one on the banks of the Nile, and the other on the desolate site in Southern Palestine, and now they are brought together, and found to be the two halves of this correspondence, a veritable romance of

archæology. In these we have conclusive demonstration that writing was common several hundred years before the time of Moses, so that this document containing the first chapter of Genesis, could have been handed down in writing, which Moses had but to embody in his own history.

But we have proof also that writing existed even before the time of Abraham, so that the first chapter may have been written as early as then, and handed down in a more correct form than by oral tradition.

Tablets giving an account of the Flood from an Assyrian standpoint have been exhumed from the ruins of Nineveh.

Assurbanipal, king of Assyria, reigned at Nineveh about 673 B. C.; he was the grandson of Sennacherib, and known to the Greeks as Sardanapalus. Having inherited a royal library of clay tablets, he determined to enrich it; enjoying political repose, like Ptolemy Philadelphus at Alexandria, he sent out scribes to transcribe for him the literature of other peoples. These scribes ransacked the record chambers of the oldest temples in the world.—Babel, Erech, Accad, Ur, and made copies of their tablets. The originals, from which these Nineveh copies were

made, were very old, claiming to have dated as much as 1,600 years before the time of Assurbanipal. That would show that writing existed two hundred years before the time of Abraham, and how much earlier we cannot as yet know. This Assyrian account of creation, the fall of man and the flood, which have been translated for us, may have been copied from the temple archives of Ur, where Abraham lived, who may have himself read the originals.

That Abraham was a scholar and an astronomer, we know; that he was familiar with writing which had existed in his own city at least for two hundred years, was probable; it is therefore at least possible, and even probable that this first chapter of Genesis was in the form of writing in the time of Abraham.

But whoever the author, this record takes a bold step; it makes certain statements on scientific subjects, commits them to writing, binds them up with a religious ritual of which the people will be very tenacious, and so preserved, it hands them down the centuries, which it challenges later science to disprove.

"Moses was learned in all the wisdom of the Egyptians," and if this chapter be only the speculation of a learned man, it may have its little

day, but it will surely be soon shoved aside and thrown into the waste basket of science.

The theories which have been advanced on the great subjects here propounded, cannot be counted; they have had their day, and soon have given place to others that in turn lived no longer than their predecessors. Prof. Henry Drummond tells us that a text book on science is obsolete in ten years; how then will this record be able to survive centuries and prove the one exception to everything that has ever been written on scientific subjects?

Here is a whole cosmogony, covering the vast period, during which all the changes on the earth took place, from the "beginning," to the completion of creation. It is liable to error on a thousand points. Whoever started this adventurous bark, sailed on unknown seas; there were a thousand Syllas and a thousand Charybdises on which it must surely be wrecked. If it had been content to make one or two statements, we should not fear so much, but it has been so indiscreet as to hazard all.

With all its vast inheritance from the past, science has not yet presumed to speak the last word on these great subjects. How dared any man or any age in the long ago, before

there was any science; how dared they commit themselves so positively and presume to make a record that will admit of no correction?

Time is a sieve which ruthlessly separates the wheat from the chaff; the gleanings which have been preserved from the past are very few; ancient books which pretend to give us knowledge on scientific subjects, are discarded, every one. But here is a record of scientific facts which is the one single exception; it has not only survived and is still read, but that it is in agreement with present knowledge is shown by this incident.

Prof. Guyot tells us that he was preparing at Neufchatel, a course of lectures on General History, he being then professor of History in the Swiss University, and thought to commence it with an introductory lecture on Cosmogony, or the world before Man, for which astronomy, biology and geology afforded facts. He worked out the order of events without a thought of the first chapter of Genesis. When his cosmogony, thus deduced, was complete, it flashed upon him, he says, that it set forth essentially the same order of events as the cosmogony of the Bible. He then took up Genesis for careful study, and found the two so much alike that the explana-

tions of the first chapter which he has published, is the result.

Before entering upon its careful investigation, let us be sure that we rid our minds of everything which we have learned about it from other sources than the chapter itself. It is not what others have said that Moses said, but we want to ask what the record itself says. We may have been told that Moses says the world was suddenly called into existence; Moses himself does not say so. We may have understood Moses to say that the earth was created a solid globe; he nowhere says so. Tradition may have taught us that creation was finished in six days of twenty-fours each; Moses does not say so. All this is but the reading into the record of the false science of the past ages.

The word "day" is used in four different senses in this record, and therefore it would be unfair to pledge it to the one period of twenty four hours only.

In the first creative day, "God called the light *day*, and the darkness He called night;" that could not have been a solar day, because the sun is not spoken of until the fourth creative day.

"And God said—let there be lights in the

firmament of the heaven—and let them be for signs and for seasons and for *days* and years;" these were days of twenty-four hours each.

"And God made the two great lights, the greater to rule the day, and the lesser to rule the night;" this day could consist of only twelve hours, or the time when the sun was shining.

"These are the generations of the heaven and of the earth when they were created, in the day that the Lord God made earth and heaven;" here day covers the whole creative period. Remembering the length of God's creative day, Moses wrote in the 90th Psalm—"For a thousand years in thy sight are as yesterday when it is past and as a watch in the night."

Let us be careful to put away all bias or preconceived notions, while we come to study this matchless condensation of scientific facts, which forms one of the three great mountain peaks of Scripture. As we scan the horizon of Revelation, the three Alpine summits which pierce the sky, are the first chapter of Genesis, the ten commandments, and the sermon on the mount. All these are evidently not artificial mounds of human erection, but are the work of divine hands.

If the apostles of science should attempt to

prepare a creed of creation, they could not equal this masterpiece of Moses; this first chapter of Genesis is the "Apostles' Creed" of science. It begins large and in a way worthy of a divine author. "In the beginning, God created the heavens and the earth."

That first verse, contains five universal terms —God—heaven—earth—creation—beginning.

"It is the weightiest sentence ever uttered; it covers all past time, all conceivable space, all known things, all power, all intelligence, and the most comprehensive act of that intelligence and power. It tells of the origin of things, names the originator, states the time of the origin, and coordinates all into one great system. This first verse is a statement on nearly all the great problems which now exercise scientists and philosophers—God, creation, the whole, eternity, cause, time, space, infinity, force, design, intelligence, will, destiny, universality. There is in it the germ of the the whole Bible, as well as the germ of all science and philosophy. Compare this first verse, with the first verse of any history, or biography, or any work of man. These begin with a date, tell the author's ancestors, or some trivial matters. The first verse of Genesis begins very differently; if nothing else in the Bible

is worthy of God, this first verse is certainly worthy of Him. Had the world met at the Almighty's feet to hear Him speak, it could have heard Him utter no sentence worthier of Him, in tones of thunder from His infinite throne." Here is the first word of history, for it begins with the beginning. Here is the first word of philosophy, for we cannot go beyond the first cause. Here is the first word of science, for we cannot go beyond the heavens and the earth. This is a sentence of great beginnings—the beginning of the world, the beginning of history, the beginning of force, the beginning of revelation, the beginning of religion, the beginning of science; the beginning, in short of the whole course of things which has come down to the present. This sentence declares there is a God, and at once settles the greatest question known to man—is there a God? yes there is, and He created all things. At once polytheism is overturned; all these which pagans worship, the sun, the moon, trees, animals, stones,—these were all created by the one God. It settles the question of creation; matter was not by spontaneous generation,—not a blind working out of force; there was an Intelligence which made and planned all. A great free will is the first cause,

the beginning of the chain of cause and effect; matter is subject to will, to thought; thought is not the effect of natural, molecular action. It settles the unity of God. God made all; He is alone, not one of many gods; if everything was made by Elohim, there is no place for any other. It teaches too, that Nature is a unity—it is one great system. Here is the foundation of universal law, the continuity of law, and all those great principles which science is now establishing so firmly. This sentence is a philosophy in itself. From the very dawn, philosophy has been working on this verse, yet in this nineteenth century it has gotten no farther. The scientific world is still engaged on the first verse of Genesis, which has furnished nearly all its current problems that are as fresh to-day, as they were in those days, and that are still pressing for a solution. "When God here spake, He spake problems for all time. For He spake so clearly that all can understand, He spake so grandly that none can fully comprehend."

"In the beginning," when was that? Tradition has said—six thousand years ago, but the Bible does not say so. Some data, from which to estimate what lapses of time have been since "the beginning," may be found in the "Great

American Desert." For the most vivid description of the geology of this forsaken region, we are indebted to Dr. Newberry, the geologist of Ives' Colorado Expedition under the General Government. This region is a vast plateau, stretching for hundreds of miles in either direction. Far in the hazy horizon may be seen the bold wall, which rises to a more elevated tableland, composed of overyling strata. These higher strata were once continuous over the surface of the lower plateau, but have here been worn away by the action of water. Still farther in the horizon, looms up another gigantic terrace, rising to the upper plateau of the desert. The traveler, journeying across this apparently monotonous plain, finds himself suddenly standing on the brink of a precipice. Down, far down into the gloomy chasm at his feet, he endeavors to cast a look; it is a vertical rent through the strata to the appalling depth of more than a mile. Far down at the bottom, winds the stream which has executed this tremendous piece of engineering, quiet now as a lamb, but in the spring time roaring and destructive as a lion. This is the Colorado river. The great Black Canon of the Colorado, is a gorge with perpendicular walls of rock three hundred miles

long, and from three thousand to six thousand feet high. All this vast tunnel has been excavated by the slow action of the water; how long must it have taken? What aeons must have rolled by while this unparalleled work was in progress? And yet this work must have been limited to the later ages, since the gorge cuts through cretaceous strata, which were deposited in the last period of Mesozoic time. Man was yet an idea of the Creator in the far distant future, and lazy reptiles held dominion of the fair domain. Vast then as was the work, and vast as must have been its duration, its commencement dates back to but the middle of geological time.

Reflect what this means as to the time since "the beginning." Here is a river which has cut its channel through solid rock to a depth of more than a mile; a thousand feet of that depth was through hardest granite; how long must the inappreciable action of water have taken to do this vast work? And yet, long, immeasurably long as it must have been, the river began that work not earlier than the last period of Mesozoic time.

The life of the earth has been divided into four great periods—the Azoic, or lifeless age; the

Paleozoic, or oldest age of life; the Mesozoic, or middle age of life; Cainozoic, or recent age of life. And the Colorado began its work, not earlier than the last of the middle period. When then must have been the "beginning?" Geological periods increase in length as we go backward. Dana estimates the ratio for the Paleozoic, Mesozoic and Cainozoic periods to be 12;3;1; that is, the Mesozoic is three times as long as the Cainozoic, and the Paleozoic is four times as great as the Mesozoic; how many times greater was the Azoic, we cannot tell. But this river work began in the last of the periods represented by the ratio—3.

Let us try to estimate the immensity of time since the "beginning" in another way. There is a crust of stratified rock, twenty-five miles in thickness, resting upon the original foundation which is commonly granite. Now stratified rock is that which has been formed in layers under water. Its materials have been gnawed off from the previous rocks by the action of water, carried off by the violence of the waves, by the action of streams, or held in solution, and have then been deposited in layers, the heaviest at the bottom, the lightest and finest material at the top; then crystallization by heat, or chemical

action, or else by pressure has solidified this material into rock. But how was sufficient material secured to form a crust of twenty-five miles in thickness of stratified rocks? The driving storms and the ceaseless erosion by the waves and streams, actually ground up all this vast supply from the old granites which lie at the bottom of this pile. This vast thickness of twenty-five miles, is built up out of the ruins of older formations. The ruthless tooth of time, even as now, silently and slowly gnawed away in this work of disintegration, and then the remorseful waters sought to atone for the deed by building the ruins up again into stratified rock. Hoary ruins they are! compared with them what are the marbles of Nineveh, or the columns of the Parthenon? Many of the palaces of modern Rome are built of the stones of which the old amphitheatre has been robbed by vandal hands. These stratified rocks are the modern structures, built up of the materials which the vandal Time has stolen from Nature's primeval walls.

But how long must that slow, very slow process been going on? The first and lowest great system of strata—the Laurentian—is in Canada thirty and forty thousand feet thick, or nearly five miles. How enormous a bulk of solid rocks was

ground to powder to furnish materials for these Laurentian strata alone, may be imagined, when we realize that the average elevation of North America is about twelve hundred feet above the level of the sea; and if the entire continent were ground to powder down to the ocean's level, and distributed over an equal area of the ocean's bottom, it would afford a bed of strata not one twentieth the thickness of the Laurentian system alone. But the Laurentian is not one fifth of the thickness of the whole crust of stratified rock. How long must it have taken for the waters to grind up in its voracious maw enough material to build up again so vast a monument to the immensity of Time? "How long, O, Lord; how long?" And yet, and yet even this does not carry us back to the beginning of which Moses speaks. It is the beginning of time itself, the very beginning of matter, out of which future worlds were to be formed. Between "the beginning" and the present, there yawns a chasm so great that not mathematics itself can fling even an imaginary arch across it.

These words are big with meaning; they try to tell of space, of worlds, of the original condition of things —new wine in old bottles. Three times in this chapter occurs the word—*bara* "to

create," and those three times are just where science too comes in and admits there must have been a creation of something out of nothing. "In the beginning" God—bara—called into being what had not existed before. After this absolute creation of original matter, this word does not occur again until the first animal life is called into being; then again God—bara—created the great stretched-out sea monsters; He called into being what had not existed before, viz. sentient, volitional life. Once more God—bara—created man in his own image; called into being what had not existed before, viz. spiritual life. Bara is thus reserved for marking the first introduction of each of the three spheres of existence, the world of matter, the world of life and the world of spirit. Wearied with her long efforts to discover whence came matter, what is life, what is spirit; with spent breath and aching brow, science puts down the problem and confesses that at these three stages there must indeed have been an original creation. At these points she says the best statement that can be made is—bara Élohim—God created. Matter is not eternal; God created the cosmic dust, that plastic material out of which our own and other worlds were moulded.

This great fact of a beginning science fully sustains. "All portions of science, and especially that beautiful one the Dissipation of Energy, point unanimously to a beginning" (Tait) "All modern science seems to point to the finite duration of our system in its present form"(Newcomb).

If matter was created, there must have been a First Cause; the original material must have been called into being by some one; Revelation says it was—God.

Far back in the hazy past, yet not lost in the bosom of eternity; somewhere within the limits of time, that original creation must have taken place; Revelation says it was "in the beginning." This is enough; this is all we can understand; no need of anything more deffinite, for finite mind can stretch its utmost thought no further. There must have been a First Cause; there must have been an original creation; there must have been a commencement in time. All this is grandly and correctly summed up for us in the first article of the creed of science—"In the beginning God created the heavens and the earth."

CHAPTER II.

PRIMITIVE CONDITION OF MATTER.

"*And the earth was emptiness aud desolateness; aud darkness was upon the face of the abyss; and the Spirit of God moved upon the face of the fluid.*"

La Place's nebula hypothesis is now generally accepted by scholars. It is emphatically a speculation and cannot be demonstrated by observation or established by mathematical calculation. Yet it is sustained by all the evidence that is attainable; it satisfies the conditions of our solar system, and is corroborated by the phases through which other systems are now seen to be passing.

There are very remarkable features in the solar system which point unmistakably to a common origin of all its members. These features are the following, first—the sun rotates on its axis in a certain direction; second, all the major and minor planets numbering more than two hundred, revolve around the sun in the same direction;

third, the planets also rotate on their axis in that same direction; fourth, the satellites revolve around their planets, also in that same direction, with the exception of the satellites of Uranus; fifth, all these bodies, with one exception, which can otherwise be explained, have their orbits on nearly the same plane, instead of flying about the sun in every possible plane as we might have expected.

To put it in another way, so that the unity of the system may be the better appreciated—two hundred planetary bodies revolve on nearly the same plane; these are all going the same way,—the satellites revolve around their planets in the same direction that the planets revolve around the sun; the planets revolve around the sun in the same direction as they rotate on their own axes; and they rotate on their own axes in the same direction as the sun rotates on his axis. Could all this be by chance? It has been demonstrated that the probability of this happening by chance is as the ratio of one, to a number containing sixty figures. There must therefore be some explanation for this uniformity.

La Place supposed that all the material in our planetary system once formed one vast central

mass, and according to the law of the Dissipation of Energy, that mass must have been at a temperature very much higher than that of the present sun.

This stupendous nebulous mass had a revolution on its axis. As time passed, this nebula cooled and contracted; but the outer rim, owing to its immense diameter, at least as large as the diameter of the orbit of the outermost planet, —this outer rim was whirling so rapidly that its centrifugal force overcame the contracting force, and a ring of nebulous matter flew off and went on spinning around the sun in the same direction it had been going before. If this ring had cooled and contracted evenly, it would have remained a ring like those still spinning around Saturn, but the outer surface radiated its heat into space, while the inner surface of the ring continued to receive heat from the central sun, so that it cooled unevenly. Contraction was therefore irregular; a strain began to be exerted which at last became so great that the ring was broken up and thrown into a revolving spiral, that finally settled down into a globe, which became the outer planet. This planet continued to cool and contract just as the sun had done, until it too, threw off a ring which

settled down into its revolving satellite. Another ring was thrown off from the sun in the same way, which became the next planet, which, also in turn, evolved its satellites. Thus the process went on, until the sun became so far reduced in size that it was able to hurl off no more rings.

This theory of La Place is also confirmed by the solar spectroscope, which shows that the sun contains in fusion the same elements which are found on our earth, thus indicating a common origin.

And it is still further confirmed by approaching the subject from the opposite direction. It is known that the sun's diameter is shortening at the rate of four miles per century, and yet owing to another law, which need not be discussed here, the sun is not sensibly losing heat. When Columbus discovered America, the sun was twenty miles larger in diameter than now; at the time of Christ, it was eighty miles larger. Carry back this reckoning, say to the time when the Colorado river was beginning to cut its immense channel, and the sun's diameter must have been vastly larger than now. Carry it still farther back, and the sun must have been as large as the whole diameter of the orbit of Mercury, and that planet must then have been in the bosom

of its parent. Carry it still farther back, and the sun's size equalled the whole orbit of Venus, and that planet was still unborn. So this reasoning will carry us back to the far ago, when the sun must have included the whole space within the orbit of the outermost planet, and all the bodies of our solar system were parts of that central mass, at a vastly higher temperature and in a far more rarified condition.

This hypothesis of La Place is still further corroborated by actual observation of the heavens. By means of his great telescope, Sir William Herschell has found faint, thin nebulæ in the condition, in which the sun is supposed to have once been; he has found other nebulæ where there seems to be a faint nucleus, and still others where the nucleus is a brilliant star-like point. Herschell thought he was thus able to view the actual stages through which our sun passed from a mass of glowing vapor, until it had condensed down to a star. The verdict of science is thus expressed by Prof. Newcomb of Washington Observatory—"At the present time we can only say that the nebula hypothesis is indicated by the general tendencies of the laws of nature; that it has not been proved to be inconsistent with any fact; that it is almost a

necessary consequence of the only theory by which we can account for the origin and conservation of the sun's heat."

Accepting now the truth of the nebula hypothesis, which Prof. Mitchell says "is the boldest thought ever conceived by the human mind," we ask—is there any conflict between it and the record of Moses?

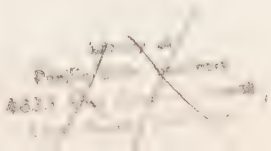
The record now proceeds to make three profoundly scientific and far reaching statements; first—that the earth was originally in just that condition contemplated by the nebular hypothesis viz. it was—"tohu va bohu—desolateness and emptiness." Second—but to go still farther back, "before the mountains were brought forth or ever Thou hadst formed the earth and the (starry) world"—then, only a fluid filled the abyss of space, and this fluid was quiescent and therefore dark. Third—original motion was imparted to this universal, etherial fluid by the Spirit of God. These are profoundly scientific utterances, let us see how they are expressed in the record, and how fully they are corroborated.

There are no words in the abrupt and practical Hebrew that could better describe that nebulous condition of the earth than—"tohu va bohu." In Is 41;29 "tohu" is translated—

"confusion;" 44;9—"vanity." In Is 34;11 "tohu va bohu" are translated—"And He shall stretch out upon it the line of *confusion* and the stone of *emptiness*." Confusion and emptiness, or emptiness and desolateness was the first condition of the earth, says Moses. La Place himself could not have described that condition more accurately. The earth was then in the bosom of the sun at an exceedingly high temperature, and consequently so attenuated as to be well expressed by "vanity" or "confusion;" so far from its present solid condition, that it could not be better described than by "emptiness" or "desolateness." If the nebular hypothesis satisfies the conditions of our solar system, much more does it satisfy the conditions expressed in "tohu va bohu."

The second statement describes a condition of things even still farther back. Says Moses—tohu va bohu was the first condition of the earth, but there was a time long anterior to this when there was no earth, and nothing but a "fluid" filled the abyss.

The word translated—"waters" is from a root meaning—"to be fluid." Of course the most common form of fluid was water, and so the word ordinarily came to mean—water; but the



record is going down to the foundations of things, and to get at the meaning we must learn the very roots of the words. It could not have meant "waters" here, for the earth's temperature was such that no water could have formed. "The deep," upon which the darkness rested, could not have meant the ocean, because the ocean was not formed until the second day; nor could it have meant our visible heavens, because all was dark; it was the abyss of space, which as yet contained only fluid matter. Now giving to the words their root meaning, read again the record. "And darkness was upon the face of the abyss; and the Spirit of God moved upon the face of the fluid." The second scientific statement is therefore, that etherial fluid filled all space, and before the Spirit of God gave to it its motion, it was in a quiescent state, and therefore dark. Is this pregnant statement born out by science? Was matter once quiescent, without motion?

According to the law of the Dissipation of Energy, just that condition of matter must have existed; there must have been a time when there was no motion, because energy is being constantly dissipated, force is being used up and therefore could not have been eternal. We know that the clock of the universe is running

down; the heavenly bodies are losing their motion and sometime will have wholly lost it; the rate of the earth's rotation has been much more rapid than now; the friction of the tidal wave will in time stop the diurnal motion of the earth; the sun is slowly losing its heat. However small these retarding forces or however small the loss of heat, yet if they had operated from eternity, the momentum of the earth and the heat of the sun would have been exhausted long ago.

This retarding influence is seen most conspicuously in the case of Encke's comet which has fallen behind in its revolution two days and sixteen hours since 1789. This quantity looks small for a whole century, but a small fraction of loss will amount to much, in the course of long ages. In 23,000 years, this comet will have lost half of its velocity. Similar retardation has been fully established in the cases of at least three other comets. The consequences of this admission are stupendous beyond conception; it records the decree of doom upon our solar system. Watson says—"If we grant that the retardation of the comets arises from the existence of an etherial fluid, the total obliteration of the solar system is to be the final result." Helmholtz says:—"A

time will come when the comet will strike the sun, and a similar end threatens all the planets, although after a time, the length of which baffles our imagination to conceive it." Winchell says —"Not for perpetuity, is written upon every lineament of the solar system. We contemplate the matter of the system aggregated into a cold and blackened mass at the center; no more sun, no more planet, no more satellite, no more comet or meteorite or zodiacal luminosity, but winter, and the silence of death, and the darkness of Nature's midnight, penetrated only by starlight, whose maternal source may have been blotted out—a solitary grave upon a distant plain in the midst of the howling desolation of an arctic winter." If mortality is stamped upon every thing; if there must be an end of all, there surely must have been a beginning; there must have been a time when there was no motion, and this first clear intimation of scripture of the primitive condition of matter must have been true.

At once the laws of physics step in and assure us, if that first statement was true, then the second also was true; if there was no motion, then "darkness was upon the face of the deep," for light is the result of motion. Moses tells us in

the next verse, that after motion had been imparted to this fluid by the Spirit of God, then light began to be, and no physicist could have stated it more scientifically. But as yet he is speaking of an earlier time; then light could not have been, but darkness only, for there was no motion. The qualities of matter had not yet been imparted; there was no chemical action, no attraction, no electricities; all was lifeless and still as the grave, before activity had been given to dead matter, and all was dark.

But whence came original motion? Ask science and she remains dumb; ask revelation and she promptly answers—"the Spirit of God moved upon the face of the fluid." The Spirit of God is the source of all power, natural and supernatural. When the Spirit of God came upon the waiting disciples, then came upon them—not faith, not joy, but the promise was—"Then shall ye receive *power*, after that the Holy Ghost is come upon you." And likewise, after that the Holy Spirit had come upon the waiting fluid matter, the same miracle again—and what stupendous results! Then universal motion; then atom approached atom and attraction began; then coalescence of atoms and chemistry began; then attraction and repulsion, and electricity

began; then accelerated motion and heat began; then persistence and increase of motion, and light began. Then the vast, vast universe, whose wheels had not begun, had its great belt connected with the fly-wheel of original power, and all that universe of God began to be alive, and to hum with busy activity. Here is the origin of power; the source of motion is not within matter, for the dead cannot make itself move and live; the Spirit of God, in natural as in supernatural realms, comes *upon* its subjects, and power is the result. Now notice how carefully the record is worded. It does not say that the Spirit of God moved in matter, or was immanent in matter, for that would mean pantheism; but the explanation is rigidly accurate. The Spirit of God moves (el penay) "upon the faces of the fluid," for He is outside of and above matter; He moved upon it from without, just as the disciples were to "receive power *from on high*."

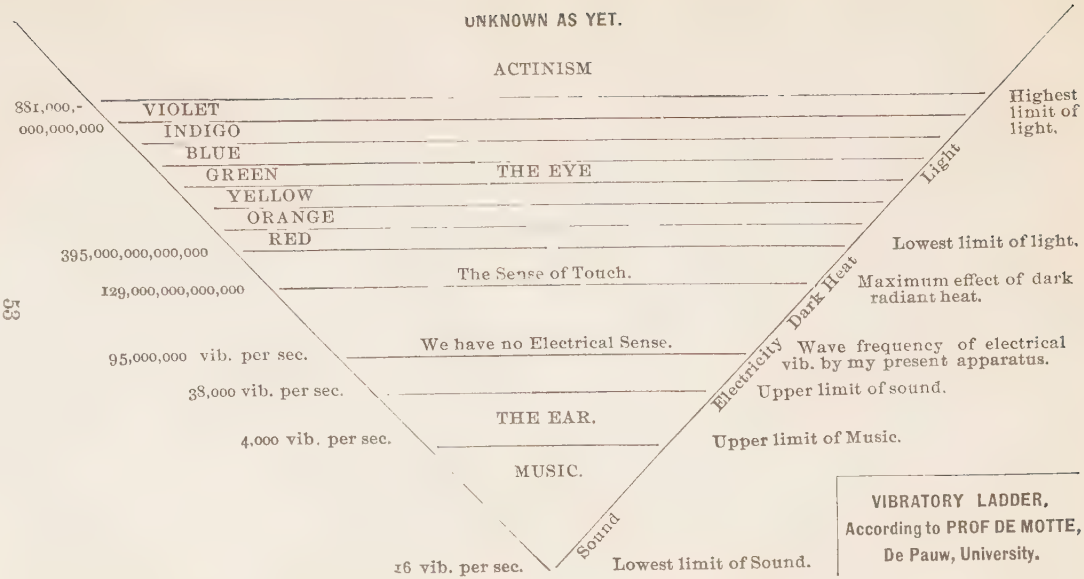
But we must study these wonderful words more closely still; if there is not verbal inspiration here, it looks very like it, for the words have been chosen with a scientific accuracy which no man, of any period previous to this scientific century, could have

chosen. What kind of motion did the Spirit of God impart to the original fluid matter? We must look elsewhere to learn what Moses meant. The word "moved," describing this act of the Spirit, in Jer. 23;9 is translated—"All my bones *shake;* I am like a drunken man and like a man whom wine hath overcome, because of the Lord and because of the words of his holiness." See a drunken man trembling, every nerve quivering with the stimulant of alchohol; it is this quivering motion says Moses which the Spirit of God imparted to the fluid. But better yet, it is used in Deut. 32;11. "As an eagle stirreth up her nest, *fluttereth* over her young, spreadeth abroad her wings &c." What kind of motion would be imparted to the atmosphere by the fluttering wing of an eagle which hovers over her nest to incite her brood to venture forth and try their own wings? No figure could better suggest vibratory motion than this; the air would vibrate by the impact of her wings, and Moses says it was this quivering, vibrating motion which the Spirit of God imparted to original matter. Now let science open wide her eyes in astonishment and ask, as the Jews asked concerning Christ—"Whence hath this man this wisdom?" What could Moses have known of vibratory motion,

when this is the great discovery of this age, and was not fully accepted until after the middle of this century?

The diagram will explain the latest known of vibratory motion. All energy is transmitted by vibrations. The lower vibrations, those affecting the ear and producing sound, are transmitted through air and other ponderable bodies. For the faster waves of electricity, heat, and light, it is necessary to assume the existence of ether—which may now be considered fairly proved. No sound, that is produced by less than 16 vibrations per second, is audible to the human ear; 4000 vibrations per second constitute the upper limit of music; 38,000 vibrations bound the upper limit of sound. The form of energy produced by the next higher number of vibrations is electricity, but as Hertz has shown, we have no sense to correspond with this. Prof. De Motte has measured the number of vibrations which produce electricity, and finds them to be ninety-five millions per second.

The ladder now takes a large step before we reach the next form of energy of which we are cognizant, which is heat. Between the upper limit of sound and electricity there must be many forms of energy, as well as between elec-


UNKNOWN AS YET.
ACTINISM
881,000,-
000,000,000
VIOLET
INDIGO
BLUE
GREEN
YELLOW
ORANGE
RED
THE EYE
Highest limit of light.
Light
395,000,000,000,000
Lowest limit of light.
129,000,000,000,000
The Sense of Touch.
Maximum effect of dark radiant heat.
Dark Heat
We have no Electrical Sense.
95,000,000 vib. per sec.
Wave frequency of electrical vib. by my present apparatus.
Electricity
38,000 vib. per sec.
Upper limit of sound.
THE EAR.
4,000 vib. per sec.
Upper limit of Music.
MUSIC.
Sound
16 vib. per sec.
Lowest limit of Sound.
VIBRATORY LADDER,
According to PROF DE MOTTE,
De Pauw, University.

tricity and heat, but we have not senses enough to correspond with them. Dark heat is formed by one hundred trillions of vibrations, and is detected by the sense of touch. As the vibrations rise in number, light is produced with which we correspond by the sense of sight.

So we find that all energy is caused by vibration. That initial vibratory motion which was imparted to original matter, says Moses, was by the Spirit of God. Here again is a philosophy as profound as the universe. Original motion was imparted by the Spirit of God, and it was vibratory. It was stated so quietly and simply, that only this scientific age saw it, just as universal gravitation had been expressed and illustrated by all that the eye of man could rest upon, but it was not detected nor understood until the progress of the ages had produced a Newton. This surprise of the nineteenth century has been anticipated by Moses for more than 3,500 years; in a few strokes of his inspired pen, he traces a whole galaxy of science and philosophy. It is not to be supposed that Moses knew all this, nor ever even knew that vibratory motion existed at all; only the inspiring Spirit could have led him to choose the exact scientific word which would describe the motion which

the spirit of God impressed upon matter.

Let us now stop to recapitulate what we have already found and ask whether Moses is so far, rigidly scientific? He tells us that there was a First Cause, His name is Elohim; that matter is not eternal, but had a beginning; that matter is not self originating, God created it; that the true order is "the heavens and the earth," for the earth is not the center of the system as was supposed; that the earth was originally "desolateness and emptyness," as contemplated by the nebular hypothesis; that matter was at first in a fluid form and filled the abyss; that there was no motion, but all was quiescent, as required by the law of the Dissipation of Energy; that therefore "darkness was on the face of the abyss;" that motion did not originate itself; that the Spirit of God is the source of all motion and force; that this force was not immanent in matter, but "moved upon the face of the fluid" from without; that the motion imparted to matter was vibratory, like that imparted to the air by the *fluttering* wing of an eagle. Here are twelve profoundly scientific utterances in two verses, which are fundamental to all that is to follow; they are as far-reaching as time, as wide as space, as reliable as

truth. They are the very core of philosophy; they are the working theories, which science may take and use in endless application.

We might suppose that one or two of these great principles could have been discovered or guessed by some genius, like those who have shone out through the long dark past, like a star of the first magnitude; but by all the chances of probability, it would have been impossible for any man or any single age, to have discovered a whole constellation of scientific truths like those which form the galaxy of these two verses. Indeed it has taken all the ages since the world began until now, to have wrought out, so as to clearly state, most of these scientific doctrines which are embraced in the opening sentences of the Bible. The world has not until now been able even to read them, though they have been here expressed in words since the record left the pen of the inspired writer.

CHAPTER III.

FIRST CREATIVE DAY.

"And God said—let there be light, and there was light. And God saw the light that it was good; and God divided between the light and between the darkness. And God called the light—day, and the darkness He called—night; and the evening was, and the morning was—day one.

The first chapter of Genesis contains the material decalogue, as the twentieth chapter of Genesis contains the moral decalogue; in the one are the ten commandments for nature, and in the other are the ten commandments for man. Ten times God "spake and it was done, He commanded and it stood fast;" ten times occurs the phrase—wayomer Elohim—"And God said." The Jews still call this chapter—"The ten words of Jehovah." These two decalogues contain the germs of all natural law and of all moral law.

Jurists, statesmen, legislators, moralists find the seed of all moral and ethical law in that grand epitome which begins with the same phrase that announced the law to nature—"*And God*

spake all these words, saying I am the Lord thy God; thou shalt have no other gods before me." Likewise philosopher and scientist are finding the seeds of scientific law—in that other grand epitome—"And God said Let there be—and it was so."

The first chapter of the Bible, and the last chapter of the Bible cast a level beam of light over vast and unnumbered ages, the one over the darkness of the past, the other over the darkness of the future. At one end stands one inspired seer and looks back, far back to the beginning, where time itself shades off and melts into eternity; at the other end stands the other inspired seer and looks forward, far forward to the end when "time shall be no more," and again shades off and melts into eternity; and between the beginning of the one and the end of the other, occur all that relates to the history of the world and of man.

As will be seen by reference to the chart, the first chapter divides itself into two trilogies, the one giving the history of inorganic creation, the other giving the history of organic creation. The respective days in each division correspond to each other in a general way. On the first and fourth days, light appears; the one is univer-

Prologue { Verse 1—Primordial Creation.
Verse 2—Primitive State of Matter.

Inorganic History, or Era of Matter.	1st. Day—Cosmic Light.	Organic History, or Era of Life.	4th. Day—Solar Light.
	2d. Day—Expanse, dividing waters, from waters.		5th. Day—Inferior Animals, fishes, birds, reptiles.
	3rd Day { 1st. Dry Land, 2d. Plants, } Life.		6th. Day { 1st. Mammals, 2d. Man, } Life.

7th. Day—God's Rest. Man's Redemption.

(*After Guyot.*)

sally diffused, cosmic light, the other is solar light radiated from the luminary; on the second day the expanse of heaven appears, in which the birds of the fifth day are to fly, and the waters form the sea, in which the animals of the fifth day are to live, for these are aquatic. On the third and sixth days, two works are performed, each corresponding to the other, and both days introduce life, the one natural, the other spiritual.

God is here calling into being, by His own free, almighty will, things which before had no existence. Let us not fail to notice how the persons of the Trinity at once appear and perform their respective works; Elohim expresses the absolute, unconditioned; the creative act is manifested by the Word and executed by the Spirit, as in all the purposes of grace.

This creation is successive—carried on through the six days; it is progressive, beginning with the lowest element—matter, and continuing by plant and animal life, until it terminates in man, made in the divine image. At each successive stage, there is a new divine impulse, but this is exerted each time on materials already existing; the forces of nature already at work, had their part in bringing about the end desired.

Matter itself is created out of nothing, but

beginning with that as a basis, each step is an advance, and the materials already formed, assist in producing the next higher results. The fluid matter existing, the Spirit gives it a new impulse, and vibratory motion is the result; vibratory motion existing, from it the command is, to produce light; the dry land existing, a new impulse is given and plants are produced; waters existing, a new impulse is given and fishes come forth. This is progressive and rigidly scientific; from the lower to the higher, from the simpler to the more complex, this is the order of Moses, and this science has discovered to be the universal law.

And everywhere government by law, becomes prominent. Every part of creation has its own specific function to fulfill; the light is to divide the day from the night; the expanse is to separate the waters above from the waters below; the luminaries are to be for signs and for seasons, and for days and years; the herbs are to be for food for man and beast. The command assigning their functions once given, are never repeated; their law is permanently fixed, from which nothing can transgress. There is no blind groping after its proper office; everything falls into its place and so continues. This too is

highly scientific; the prevalence of law throughout every department of nature is the best established of all the large generalizations of science.

The great principle of subordination of the lower to the higher is also most completely ratified by science; each step in creation is upward as well as onward. When the successive stages receive the divine commendation—"and God saw that it was good"—it is not for itself alone that it receives this seal, but especially is it good as a preparation for the next higher step. Light is good, not only in itself but as a preparation for all that is to follow; earth and sea are good as a preparation to their being inhabited.

The thing first needed is created first, because there is everywhere a principle of dependence of the later and higher, upon the earlier and lower. Animals depend upon the plants for food and not the reverse; plants depend upon the soil; plants and animals alike depend upon the atmosphere. And last of all, man appears when all necessary preparation has been made for him, for he is the crown of creation, the apex up to which this great pyramid has been shaping. And all things are subordinate to him; they are all placed under his dominion. Nothing can be

more scientific than this principle of subordination of the lower to the higher, which runs throughout the entire record, for the universe is one organized whole, in which every member depends upon that below, and is a preparation for that above. And even when we reach the apex, we still find that man has not come to rest; while he is to use all things for his purpose, yet he himself is not to live for a selfish enjoyment, but for a use above himself.

Nature now receives her first commandment —"And God said—Let there be light, and there was light." Let us recall what was said at the close of the preceding chapter. The Spirit of God has just imparted motion to this fluid mass which fills the abyss of space; we saw that it was vibratory motion which had been given; now ask science what would necessarily follow? She replies, after motion there would be first heat and then light, according to the great modern discovery of the law of the correlation of Forces: "and it was so."

We must give the author credit for the mistakes which he avoids, as well as for the scientific truths he pronounces. How easy it would have been to have slipped in the sentence—"and the Spirit of God moved upon the face of the fluid"

—AFTER the command to the light, but if he had done so, he would have been immediately convicted of error. He places the creation of light after vibratory motion, and what is just as remarkable, three whole days before the account of the sun. How could any one, unacquainted with latest science have known that there could be light without the sun? The first evidence that creation had really begun, was a flash of comical light darting through the black abyss; afterward nebulæ would form to condense into revolving suns.

And now occurs another statement that could not have been known by man until the last half of this century. Not until the spectroscope had been invented could any one have said—"and God saw that it was good." How could light be good and adapted to its purpose, until the sun had appeared? This is a statement of pure science, for light is found to be good the moment it appears. The spectroscope shows that light, proceeding from a nebula or cloud of fire mist, has the actinic qualities and properties of solar light.

And still another scientific accuracy appears where no one but an inspired man or a modern scientist could have made it. Light is called

good, before it is said that "God divided the light from the darkness." Ancient philosophy regarded light and darkness as distinct substances, as the Persians regarded good and evil to be two distinct powers, whose demons Ormuzd and Ahriman were ever contending. Any one else would have understood the dividing the light from the darkness, as separating the good from the bad, straining out the darkness from the light, and so leaving it good, and would therefore have reserved the divine commendation until after that dividing process had been completed. But Moses says the light was good, before God had divided it from the darkness, and he is scientifically correct.

But is the statement that "God divided between the light and between the darkness," correct at the point where it is introduced? Let us recall La Place's nebula hypothesis, and see how fully it corroborates this statement. When first thrown off from the sun, the earth was a luminous body itself; it was a burning star, like the sun, but much smaller. Its satellite, the moon received most of its light and heat from the earth, as the earth now does from the sun. Being much smaller, the earth cooled far more rapidly than the sun, so that in course of long

time, it ceased to be a luminous body; its fires flickered and died out; a solid crust formed over the glowing interior, and the earth became a spent star, no longer visible by its own light.

Right there, when the earth had lost its luminosity and began to be a dark opaque body, the Creator actually did divide between the light and the darkness; day and night did then begin. Of course the earth had always rotated on its axis since it had come forth in the sun's birth pangs, but as the side of the earth opposite from the sun, still shone with its own luminosity, there could be no night. But as soon as the crust had formed and the earth was no longer giving out light from its own fires, then there was night on the side that was turned away from the sun, as now, and day and night did begin. "And God called the light—Day, and the darkness He called—Night;" Moses is correct in assigning the beginning of day and night to that first creative day, that is, to the time when the earth had so far cooled as to lose its own luminosity. The next creative act, the clearing away of the expanse so as to form the open starry heaven, could not have occurred until this cooling had taken place as we shall see in the next chapter.

What was meant by the expression—"and the evening was and morning was—day one"? This could not mean a natural day, for that would have been expressed by night and day, instead of evening and morning. It could not refer to the result of the earth's diurnal rotation, for that had already been stated and correctly named. Evening is the natural close of a day's work; morning is the opening of another day's work. The evening and the morning therefore, were simply the marking off of God's creative periods; this was the announcement of periodic cessation from labor between each of the creative days, as a whole day of rest from creative work followed the six days. Man should need not only a whole day in seven for rest from labor, but a period of rest between each one of those six days, and here God sets the example to him who was to be created in the divine image.

Whether geology will ever be able to identify these periodic rests from labor, or not, cannot be foretold, but it is not necessary that it should, any more than it is necessary that geology shall tell us how long God's creative days were.

The first product of the creative work is light. Let the Spirit of God come in contact with matter, and light is the result, good light. The

same great marvel and miracle takes place in the moral world when the Spirit of God comes in special contact with our race. Said the angel to Mary—"The Holy Ghost shall come upon thee and the power of the Highest shall overshadow thee, therefore also that holy thing which shall be born of thee, shall be called the Son of God." The result of the Spirit's special contact with our race, was the great moral light, "The Light of the World." In both instances the quickening influence of the Spirit of God produces the same result.

Once more let us sum up the facts so far enumerated. In this chapter we have found—that creation is successive, not instantaneous; that it is progressive, from lower to higher; that government by law is universal; that there is subordination of the lower to the uses of the higher, because each advancing step is an upward step; that light results from vibratory motion; that it is good light, even though nebulous; that light long precedes the appearance of the luminaries, the sun and moon; that it is good, even before light is separated from the darkness, because the earth ceases to be luminous; that daily rest was inaugurated from the beginning, as well as a weekly rest of a whole day. Here

we have ten more great statements to add to the previous twelve, in all of which we have not met one challenge from science, but on the contrary the most hearty and astonished agreement.

CHAPTER IV.

SECOND CREATIVE DAY.

"And God said—Let there be an expanse between the waters, and let it separate the waters from the waters. And God made the expanse, and separated the waters which are under the expanse from the waters which are over the expanse; and it was so. And God called the expanse Heaven. And the evening was, morning was, day two."

In the second creative day we find ourselves almost on historic ground, compared with the ageless depths from which we have just emerged. Matter, having received motion, swirled into one immense nebula; this broke up into countless suns, all still revolving, according to Maedler, around one common center, situated in the region of the Pleiades. Our own sun has thrown off its rings, which have settled down into as many planets, with satellites which they in turn threw off, revolving around them. At last our earth has became a settled planet and has thrown off its ring, which has cooled down into the now dead cold moon. The crust has formed on the cool-

ing earth and the successive steps of preparation for the abode of man, have begun.

The time that has elapsed from the first formation of its crust until now, computing by the rapidity of the radiation of its heat, has been estimated by Sir W. Thompson as from one to two hundred millions of years. Prof. Guthrie Tait, on the other hand, argues that from ten to fifteen millions of years would be sufficient, while Lockyer suggests a longer time even than that of Thompson.

The gasses that filled the atmosphere, have sufficiently cooled to form chemical combinations; two atoms of Hydrogen unite with one of Oxygen, and vapors of water begin to appear, for all the water which now fills sea and river, then existed in the form of hot gasses, which were prevented from uniting to become compounds, by the excessive heat.

The translation—"firmament" is most unfortunate, and is another instance where the translator read into the record the science of his age. The translators of our authorized version, were misled by—firmamentum—by which the Vulgate translated the Greek—stereoma—of the Septuagint. Stereoma and firmamentum, both mean something solid or firm, by which the

heavenly bodies were thought to be upborn.

It would be most unfair to convict Moses of a mistake, because of a mistransalation in our version; yet Prof. Huxley accused Moses of being unscientific because he uses the word—firmament, when Moses does no such thing. The Hebrew word used is—rakiach, and means something expanded or beaten out; it radically refers to the work of a metal worker when he has beaten his metal out into thin leaves. The idea is correctly expressed in Is. 42;5—"thus saith the Lord, He that created the heavens and stretched them out; He that *spread forth* the earth;" referring to an extent of landscape. Ex. 39;3 "And they did *beat* the gold into thin plates"—simple extension. Job. 37;18 "Hast thou with Him spread out the sky etc."?

The idea therefore which is expressed, was simply that of extension, without reference to solidity. A more correct translation of the word is "expanse," instead of firmament. That it could not have meant anything solid is perfectly clear from the record itself, which says a few verses below, that the birds are to "fly in the open firmament of heaven."

Before following Moses any farther, we shall turn to science, and ask her to tell us the story.

We have accepted the nebula hypothesis. According to this, the earth was once a self luminous body as fiercely hot as the sun itself. All that is now solid must then have been in a liquid form, and the more volatile substances were gaseous. All the carbon in the world was then carbonic acid gas, all the sulphur was sulphuric acid, all the water was then invisible steam. All that we now behold must have been represented by a glowing liquid nucleus, enveloped in a dense atmosphere of burning acrid vapors. The sun was then shining as now, only larger, and possibly earth has thrown off its ring to roll up into a globe of fire, but being so small, soon cooled down into our dead moon. The fiery glance of the sun was met by a fiercely burning glance from the earth, where reigned chaos terrific. Here was death and confusion, upon which the uncreated alone looked down and saw order and life and beauty germinating in the heart of universal discord. Radiation of heat went on through the slow ages, also contraction. The least fusible elements began first to crystallize; when the temperature had sufficiently lowered, a solid film formed over the surface of water.

The earth was then rotating as now; sun and

moon, then as now, reached forth their attracting influences to solicit the tides of the fiery sea. But the film was quickly broken up by the tidal waves, just as now the ocean's tides break up the ice which may have formed. In time however, the crowding, jostling fragments began to congeal permanently, as the broken ice of the Arctic seas, after being worried by winds and currents, seizes an interval of calm to consolodate into a vast rugged floe. The rock floe of this fiery ocean, formed at length a rough and jagged crust; the granites were then laid as the foundation, on which long afterward, the water-formed *rocks* were to be *deposited.* These jammed and rugged scoriae of crystalline rocks were to be ground up through the succeeding milleniums; the granite grist was again deposited as stratified rocks beneath the water; these were again to be reground, and the mass worked over and over, as a woman works her dough, to form the soil, on which the long distant future should see life blossoming with verdure and beauty.

Of course no water could then have fallen on the parched and blackened earth, for all was too hot; all the present waters of ocean, lakes and rivers was then an invisible gas. At length the time arrived when the remoter regions of the

atmosphere had been so far reduced in temperature, as to cause condensation to begin; vapor began to appear on the far off edges. Clouds formed and grew and thickened and darkened. till a pall of impending gloom enwrapped the earth, and the light of sun and moon and stars were shut off for another geological age. Particle drew particle to itself, and rain drops began to precipitate themselves through the lower strata of the fervid atmosphere. In their descent they were scorched to evaporation again; the vapors hurrying back to the bosom of the cloud, were again sent forth, to be again consumed. At length rain-drops reached the fervid crust, only to be exploded into vapor and driven back to the overburdened cloud, which had an ocean to transfer to the earth. The clouds poured the ocean continually forth, and the seething crust continually rejected the offering. The field between the cloud and earth was one stupendous scene of ebullition; ten thousand Niagaras poured into as many Etnas.

The descent of the rains and the ascent of the vapors disturbed the electricities of the elements; in the midst of this contest between fire and water, the voices of heaven's artillery were heard: lightening darted vivid through the

Cimmerian gloom, and world convulsing thunders echoed through thickest darkness. It was a battle of the elements.*

Let us realize that three fourths of the earth's surface is covered with water, which is sufficient to cover the whole globe to the depth of 12,000 feet. At that time all the water was in the atmosphere, so that the pressure on the hot surface must have been enormous, no less than 6,000 pounds to the square inch, from that cause alone Now we know from the laws of chemistry that great pressure will force vapor into a liquid, long before the steam has lowered to the point of liquefaction. There must have been therefore a sea of immensely hot water, long before the temperature had been sufficiently lowered for steam to condense into water, of its own accord; a boiling sea below, was prevented from escaping back into steam by the enormous pressure, and a sea above held in the form of vapor all the rest of the present waters.

Consider what vast amount of water can now be held suspended in the atmosphere! In many storms the fall of rain will exceed two inches, but the amount of water on an acre to the depth of one inch will weigh 100 tons. The

* Figuier and Winchell.

city of Cleveland covers an area of about eight miles by four, or thirty-two square miles. If rain should fall upon this area to the depth of two inches it would mean that four million tons of water had been held in suspension over this city during a single rain storm. All the rivers are simply the overflow of the vast reservoir of our atmosphere; the Amazon, the Mississippi, the Niagara and all the rivers of the world are carrying away the excess of water which the atmosphere once held, but can hold no longer. But at the time under review, the atmosphere was intensely hot, and therefore capable of holding vastly more than now; there was truly an ocean above, and an ocean below.

Now let us turn to Moses to see whether he has given a correct account from his side. "And God said—Let there be an expanse in the midst of the waters, and let it divide the waters from the waters." At this point there was water only both above and below, for the hot vapors rested directly on the hot sea. Radiation goes on slowly, and the vaporous atmosphere requires a long time to cool sufficiently to make a clearing. Finally the clouds become thinner at the surface of the earth; the dense fogs begin to lift and something like a clear atmosphere opens out

into a growing expanse, which does literally divide between the waters which were above and the waters which were below. Still the clearing went on; the clouds float higher and grow thinner, until a faint ray struggles through the gloom. At last the whole expanse is cleared, and God called it—Heaven. The account of Moses agrees exactly with that of science, and still we find no hint of the dreaded conflict.

But to get at all its meaning, we must carefully study the words of this record. Recall therefore that the Hebrew word translated—firmament, is rakiach. Lexicographers tell us that it is an onomatopoetic word, that is, one whose sound represents its meaning, as buzz of bees, crackle of burning thorns. Some maintain that all words had their origen in this way. Rakaich is such a word, and refers to the din and terrible racket of a gold-beater's or metal-workers' shop, and could almost be translated—racket; if one goes into a boiler shop where the sheets of iron are being hammered, he will understand the meaning of this word.

Now see how accurate is this description of what took place as the clearing was forming. The electricities were disturbed, as described a few pages before; the fearful lightenings shot out

their angry flames, terrific thunders almost sounded the crack of doom. It was a racket indeed; an expanse seemed to be beaten out by some titanic hammers, whose claps shook the earth. In one word, Moses has told us a fact and its method of formation, which science can tell us only in many pages.

Still more; there was only water below the expanse, according to Moses; in the succeeding day when the dry land emerges, the positive statement is made that there was then a universal sea, that covered the whole earth. No statement is more abundantly corroborated than this. What mean the strata of rocks which everywhere overlay the earth, in some places twenty-five miles in thickness, but that water had once covered the whole surface of the earth, for stratified rocks can be formed only beneath water.

Winchel says—"A thousand years of storm and lightning have passed, and the primeval tempest is drawing to a close. The waters are now permitted to rest on the surface. By degrees the clouds are exhausted, and sunlight filters through the thinned envelope. As the morning of another geological epoch dawns, it reveals the change of scene; the surface which in the preceding age was scorched and arid, is now a universal sea of tepid waters."

The action of water was essential for the great work of preparation and purification, before the earth should be fit to receive life. The hard and bare rocks must be ground up and worked over and over; the high temperature enabled the water to dissolve many substances which are not soluable in cold water, and which are needed for the future soil. No living man had seen a universal sea, and so improbable a fact could not have been guessed until the leaves of rock on which the fact had also been written, was opened by the geologist, but both Genesis and Geology agree in their testimony that the surface of the earth was covered with water.

Notice also how scientific is the order of these events. The clearing of the atmosphere comes *after* God had divided between the light and the darkness, that is, after the time when the earth had so far cooled as to be no longer luminous with its own heat. If this clearing of the atmosphere had been placed before the division into day and night, there would have been a great scientific blunder detected at once, for Moses would have asserted that water existed at a time when the earth was still so intensely hot as to be self-luminous, which would have been absurd. The components of water are known to be in

the sun, for the spectroscope shows that hydrogen and oxygen are there, but the heat will not permit these atoms to unite to form water. So while the necessary ingredients were present upon the burning earth, there could be no water formed until the crust had so far cooled as to be dark, when night would occur on that part which was turned away from the sun. So it is after that time that Moses correctly puts the formation of water.

Another position, eminently scientific, Moses unhesitatingly assumes, in the fact that he here witholds the divine commendation. In the first day, he told us that the nebulous light was "good," and the spectroscope fully sustains that statement; but on the second day, he does not add the word of commendation; the atmosphere is not said to be "good."

This seems like a great oversight, and therefore the translators of the Septuagint undertook to correct this mistake of Moses, by adding—"and God saw that it was good." But science comes in to sustain Moses, and declares most positively that the atmosphere was not good at that early time. The oxygen had been burned out and the atmosphere was full of carbonic acid gas which was inimical to life; even plants could not live

in an atmosphere so overcharged with carbonic acid, and it would not be fit for respiration for many a century. Not until the carboniferous period, when plants flourished most luxuriantly, absorbing the carbonic acid and replacing it with oxygen,—not until then could animal life exist, nor would the atmosphere be good. The appearance or absence of this certificate of the Creator, testifying that the work was or was not adapted to the function it was intended to fulfill, is highly scientific, as we shall have reason to notice as we proceed.

This second creative day corresponds to the Azoic period of geology. The crystalline rocks have been formed, the waters have begun their long and slow work of disintegration to produce new rocks, but no life has as yet appeared. This was a period of preparation; to none but to the eye of the Infinite Himself, could any prospect of what should be, have appeared then, even in dimmest suggestion. The work to be done was great, and the time needed would be long; but no; this is incorrect to say, for great and long are only relative terms, to be used by finite creatures, but not by the Infinite.

Again we have found five more, wide reaching statements, all of which are fully borne out by

modern science. First—there was a sea below, owing to the enormous pressure at the surface of the earth; second—the expanse, or clearing away of the vapors, was literally "in the midst of the waters; third—there was at first a universal ocean; fourth—the dry land did not appear until another geological era had passed; fifth—the atmosphere was so full of carbonic acid gas, that it was not fit for breathing either by plant or animal; it was not "good." In the twenty-seven steps so far taken by the Mosaic record, it is accompanied by science, which walks by its side in perfect agreement, without one word of discord.

CHAPTER V.

THIRD CREATIVE DAY.

"And God said—Let the waters under the heavens be gathered into one place, and let dry land appear; and it was so. And God called the dry land earth, and the gathering of waters called He seas; and God saw that it was good. And God said—Let the earth bring forth grass, herb yielding seed, and fruit trees yielding fruit after its kind, wherein is the seed thereof, upon the earth; and it was so. And the earth brought forth grass, herb yielding seed after its kind, and trees bearing fruit, wherein is the seed thereof after its kind; and God saw that it was good. And evening was, and morning was—day three."

The thought must not escape our minds, that Moses is giving in one chapter, what would have required vast libraries, filled with countless volumes to have fully described. He has given a sketch in largest outline, only one rapid sweep of the inspired pen across the geologic ages. We may not therefore ask—has he told us what we think should have been told, but only—is he correct in what he has said? And if his pen was

inspired, let us expect that much will be found which does not appear on the surface.

He has brought us down to the time where the water that had been held in the atmosphere in the form of vapor, has been precipitated upon the cooled crust and has formed a universal sea. Contrary to what he could himself see, contrary to all human experience, he yet persists in telling us that water covered the whole suface of the earth, and that the land afterward emerged from beneath the waters.

We turn again to science to ask if that was so? she answers promptly—"it was so." Radiation of heat had been going on for untold ages; as the earth cooled, it contracted and finally the crust became hard and firm. On this crystalline crust the waters were deposited until they covered the whole earth, and in them the vast piles of stratified rocks were formed. But still the radiation of heat went on, but more slowly as the crust thickened; and still the earth contracted. At first the crust rested on the surface of the molten interior, as ice rests on the surface of the water. As the contraction still continued, the interior withdrew its support, as the water leaves the ice suspended when it has sunk away into the ground. For a time the crust could

support itself notwithstanding that it did not rest solid at every point, but finally it was compelled to crumple up and adjust itself to the smaller interior. This it could do only by folding itself into wrinkles, as a garment will wrinkle if too large for the person. These wrinkles of the earth's crust are the mountains, which appeared above the water at the divine command.

Very large wrinkles, we may think, but the fact is, they are very small compared to the size of the earth on whose surface they have formed. The diameter of the earth is nearly eight thousand miles; a wrinkle ten thousand feet high would be like a paint blister raised one tenth of an inch on a house thirty-five feet high. But the mountain ranges hardly average three thousand feet in height, which compared to the size of the earth, would be like a wrinkle on an apple, so small that it could not be seen without a magnifying glass. So the dry land obeyed the creative command, in the way and at the time indicated in the record.

"But a new agency soon began to work, an agency of terrific power; volcanic outbursts of fearful extent took place. As the wrinkles would crack in some places and form great rents in the crust of the earth, the cooled surface

water would pour through the openings, and coming in contact with the internal molten fire, would cause explosion after explosion, upheaval after upheaval; vast stretches of earth's surface, hundreds of miles in extent, would be pushed up above the ocean, amidst the most terrific thunderings and awful crashes. We all know how disastrous to a red-hot boiler is the sudden inlet of water turning to steam; it exerts a force that bursts the strongest bands of iron. Imagine vast masses, millions of tons of water, suddenly precipitated through the gaping earth upon the molten rocks and liquid fires beneath. It is impossible for us to conceive the awfulness of the scene, but monuments of that age of thunder exist, which speak to us of its terrific forces. The Andes, the Himalayas, the Alps, and other vast mountain ranges, are the upheavals of this period of the world's history, and standing monuments of the day when the Lord said – Let the dry land appear."

The objection will doubtless be raised, that it was not by divine command that these results were brought about, for science teaches that they were accomplished by the laws of nature. That phrase –"laws of nature," is misleading; it is often used as though law contained a power

in itself to effect results. Law is only the *method of action*, in which works a force outside of itself; the laws of nature are only grooves, through which some mighty force moves. What is the force? Not nature, for nature is a result, not a cause. It is not inherent in matter, for science has proved that there is no self-originating nor self-perpetuating force in matter, because matter always tends to come to rest, unless it is moved upon from without. The only originating force of which we are cognizant, is will; this alone can originate force and direct it to an intelligent end. Therefore back of the laws according to which nature is compelled to move; back of nature itself, which cannot originate action or motion, but can only carry out that which has been impressed upon it; back of all, there must be a mighty Will, if we may be permitted to reason from the seen to the unseen. Moses says it was Will that caused all these effects, and its name is God; "and God said—let there be, and it was so;" and science offers no objection.

These original wrinkles formed the outlines of the future continents; again and again the crust had to double up and compress itself together to conform to the shrinking interior, and so the continents gradually grew.

Prof. Guyot has shown in a beautiful and convincing way, a unity of design in all the great mountain systems, which form the skeletons on which the respective continents are built. The systems all run from north-west to south east, or from north-east to south-west, and the contour of the continents is formed by these boundary masses, as will be readily seen by the study of a map of the world. The same system also runs through the oceans, for the islands of the sea are only the tops of such mountain ranges, and their general direction is the same. These lines of crumpling are all arranged in great circles of the earth, tangent to the polar circle. There is therefore a uniformity in the arrangement of the whole mountain system of the earth.

Thus science shows that not only were the creative commands carried out in exactly the way described, but that one great system is apparent in all the ranges which marked out the boundaries of the future continents, showing that it was one directing Will that was obeyed.

"And these wrinklings of the earth's crust are still proceeding at the present, though not as formerly, because the crust is becoming thicker as the cooling still goes on. Some countries are gradually rising above the ocean, while others

are being depressed. Norway and Sweden, for instance seem to be situated upon the convex side of one of these wrinkles; marine beaches are found hundreds of feet above the present sea level; and by careful observation it has been found that a gradual upheaval of perhaps four feet a century, is still taking place. In almost every country, marine shells are found on the top of the highest mountains. Each upheaval necessitates a corresponding depression; thus along the east coast of England, there is a depression of the land, and the ocean is slowly encroaching. Once England was so high that there was no English Channel, but it was joined to the continent, and no channel existed between it and Ireland." These changes are not perceptible to us, because our lives are so short, but for many centuries they have been proceeding. Areas have been raised above the sea, and then depressed as some other elevation took place elsewhere; they were again raised and again depressed, for whole continents thus oscillate. South America has along its western coast, what are called parallel roads, which are nothing but sea beaches, that have been raised one after another, and the eastern coast has been correspondingly depressed. But these changes do not

always go on so quietly, even now. Occasionally we read of fearful earthquakes which entirely alter the configuration of the whole country. Land is forced up where no land had existed, and the waters of the ocean are hurled in a mighty wave against the opposite coast line, overwhelming cities and villages. But how must it have been in the earlier ages of the world's history, when all these forces waged a thousand fold power? Geologists are agreed that the Devonian era was one of fearful volcanic disturbance. How marvellously the Psalmist describes the wonders of this age of thunder in the 104th Psalm—"The waters stood above the mountains. At thy rebuke they fled; at the voice of thy thunder they hasted away. They go up by the mountains, they go down by the vallies, unto the place which Thou hast founded for them."

The next statement is also thoroughly accurate, but wholly impossible for any uninspired man to make—"Let the waters be gathered together into one place." In his Manual of Geology, Dana expresses this fact in almost the same words, though without any reference to Genesis; "while the continents are separate areas, the oceans occupy *one continuous basin*." Exactly; but

how could the author of this order have known that the waters on the earth was one vast body, while the continents were isolated islands?

Think of the situation; had the writer looked upon the Mediterranean sea to the westward, and the Red sea or perhaps the Arabian Gulf on the south? Had he doubled the Cape of Good Hope to find that both were one and the same bodies of water? But even then, he would have known nothing of the Atlantic stretching west from the Pillars of Hercules, and still west until it joined its waters with those of the Pacific, which in turn would carry on the connection until it had traversed the round earth and had joined again the waters of the Red Sea. No one could have known that, until after Columbus had made his great discovery three thousand years after the time of Moses. Until the world had been circumnavigated by Magellan, not a scientist living on the earth could have made that statement which is advanced so boldly, that "the *waters under the heaven* were gathered together into *one* place." One might have said—the waters under the southern heaven is one body; or perhaps the waters under the western heavens; but for three thousand years after this statement had been made, science could but place herself

squarely against Revelation, and insist that here is a geographical mistake. How did this old record get a three thousand year start of science?

The divine approval is again given to the work that has so far proceeded on the third day; "the earth and seas are pronounced good." Does geology bear out this statement? Certainly not, if it is meant that the dry land was good, as soon as it had emerged from the water. At first it was only black lava, and this would require many ages before it had been ground up and worked over to produce soil; this material needed to be enriched by lime taken from the sea, beneath which geology finds the land has been submerged again and again; it needed to be enriched by carbonaceous matter from the decomposition of plants and animals, before it was capable of sustaining vegetation, and could be called "good." At first, the sea also was unfit for life; vast qantities of lime, silica and other impurities held in solution, had to be removed by marine vegetation, which took up the excess of mineral mater and carbonic acid, before the sea could be called "good."

Is there then a conflict here? Not unless we believe the arrangement in verses was inspired. The clause expressing the divine approval is

placed in the tenth verse, and so makes it appear that it was given immediately after the dry land and seas had been separated. This was another reading of the science of the day into the record, and so making it false. But place this clause at the beginning of the eleventh verse, instead of at the end of the tenth and all is correct. "And God saw that it was good; and God said—let the earth bring forth grass, etc." When was the approval given? Moses does not tell us when; but geology says long, very long after the emergence of the dry land, did it become "good." All that Moses says on the subject is, that the commendation was given before the next step was taken; it was "good," before the earth was commanded to bring forth vegetation, and this is perfectly correct.

We must not read these statements, which describe the events of, no one knows how many, ages, as though they immediately followed each other. The few facts here given are like the tops of mountain peaks, along whose range we are looking; all these peaks seem to lie close together, owing to the lack of perspective, but when we come close to them we find that they are separated by wide intervening vallies.

These facts may seem to lie close together,

because the narrative gives no intervening spaces between them; imperfect science used to read them as though they followed each other immediately. But now that science is able to walk over the same ground, it finds that while the great facts are true, yet there are immense gaps between them in regard to time. There is an immense gap between the emergence of the dry land, and its being good, though from our view point we can not see it.

We now approach a difficulty which has made Revelation seem to be in hopeless conflict with science. "And God said—let the earth bring forth grass, herb yielding seed, and fruit tree bearing fruit after its kind, wherein is the seed thereof, upon the earth; and it was so." But geology says that this was not the first vegetation, for marine vegetation had existed long before land vegetation appeared; indeed marine vegetation helped to prepare the soil on which land vegetation could live. Likewise on the fifth day the record tells us—"And God said, let the waters bring forth abundantly the moving creature that hath life, etc.," while geology again insists, that living creatures had existed in the sea, long ages before the time of the fifth creative day. How shall we reconcile these two authorities on these points?

There needs to be no reconciliation. The difficulties arise because we have not expected this record to be scientific, and therefore we have not read it with that care with which we would read a book of science. Every statement of science we expect will be both inclusive and exclusive. For instance, if a scientist speaks of vertebrates, we understand him to carefully *include* all the animals which have a spinal column, but also *exclude* just as rigidly all which do not have a spine. If now we would read this record in this way, we should be relieved at once of many supposed difficulties.

The charge is that geology says that a marine vegetation came into existence first, while Moses speaks first of land vegetation. Now the truth is, that Moses has not chosen to speak of marine vegetation at all; it may have existed for ages before the dry land brought forth grass, but Moses is confining himself exclusively to land vegetation. He tells us plainly that it was to the EARTH to which God spake to bring forth grass, and of course it brought forth what it was commanded to do. There is no conflict whatever here; geology says marine vegetation came first into existence. Very well; it may have been so, for all that Moses says to the contrary;

he has simply said nothing about marine vegetation, but warned us that it was of land vegetation of which he was speaking, and in this he was perfectly correct.

Likewise the difficulty of the fifth day will also disappear, if we read the statement with rigid attention. Geology tells us that animal life existed long ages before the time of which Moses speaks. Protozoans had already swarmed in the sea for many centuries. Chalk is now found to be the remains of the shells of minute sea animals, which absorbed the lime from the water and converted it into chalk and limestone formations. The chalk deposits are so vast that along the English Channel they tower up in cliffs one thousand feet and dazzle the eye with their brilliant whiteness, giving to England the name of Albion. This chalk formation extends across the continent of Europe for more than eleven hundred miles in length, and eight hundred miles in breadth. But these animals that inhabited the chalk shells, lived long before the fifth creative day.

But now read the record with that care which would be exercised in reading a scientific statement, and the apparent conflict disappears. "And God said—let the waters bring forth

abundantly the moving creature that hath life etc." What kind of creature is Moses speaking of which appeared on the fifth day? It is the "*moving creature.*" But these earlier protozoans, of which geology tells us, were not "moving creatures;" many were what may be called agglutinative creatures; animals which builded themselves fast to each other, as the corals now do; they could not "move," but were stationary, and so it was not of them at all that Moses was speaking. These were rigidly excluded by the careful terms he used—"moving creatures." The Spirit did not propose to tell us about protozoans, and other inferior animals which could be seen only with a microscope; what He gave Moses to say, was that the class of creatures carefully described as "moving creatures," appeared on the fifth creative day. Likewise of the introduction of marine vegetation, the record does not speak; this is one of those unseen vallies which intervene between the mountains, whose peaks have alone been brought into sight by the light of inspiration, which has illumined them. Again there is no conflict between Revelation and Science, for they are speaking of different kinds of life, and both are true.

It is on the third day that vegetation is

created, but not until the fifth day that animal life appears, and here again is enunciated a great scientific truth which is abundantly corroborated, viz, that plant life precedes animal life. Carbonic acid gas, with which the atmosphere was laden, was propitious to the growth of plants, but inimical to the existence of animals. The vegetable and animal kingdoms are complementary to each other; the plant absorbs carbonic acid and exhales oxygen, while the animal reverses this process and absorbs oxygen but exhales carbonic acid. In this way the atmosphere is preserved pure, and fit for both plants and animals, for what is used by the one is produced by the other. At first however, the plant alone could exist, which must prepare the atmosphere and the soil for the introduction of animal life, and the order of their introduction given by the record is correct. Geology has found fossils of plants and animals in the same rocks as though their introduction was contemporaneous, and it had to depend upon its own reasoning to prove that the plant must have preceded the animal. In late years, however, graphite, from which lead pencils are made, and which is found in igneous rocks, has been proved to be of vegetable origin, and so the rocks too, add their testimony to the

reasoning of the geologist, and confirm the order given by Moses, in which the plant has the precedence of the animal.

This order is rigidly scientific also for another reason. The plant lives upon inorganicmatter, but the animal lives only upon organic matter. The function of the plant is to take the inorganic and convert it into organic, and so furnish food for the grade of life next above itself; the plant stands as the connecting link between dead matter and the living animal.

It is one of the miracles of nature, common, yet none the less a miracle, that the particle of rock that has been broken off from the mountain by the hammer of frost and washed down to the valley by the freshet, can be seized upon by the rootlets of the plant, and elements extracted which are organized into living material. This material is handed on by the plant to the ox which feeds in the meadow; the ox lays down its life for the life of man and passes on these elements until they are incorporated into a human body; perhaps they go to nourish the brain, by which thought is evolved, which flies out to grapple with the secrets of the stars. Here is a miracle indeed! the rock of the mountain has some con-

nection with the thought that calculates the orbits of the stars. Somehow, the rock becomes a wing, by means of which thought flies to the Pleiades. The plant takes dead matter and organizes it into living material, upon which alone animal life can subsist. Therefore the plant must have preceded the animal in the order of its introduction upon the earth, just as the Bible record gives it.

But the time of this introduction is also to be noted from another point of view. We saw in chapter III, that the six creative days divide themselves into two great classes; the first three constitute the era of matter, the last three constitute the era of life. But let us notice carefully that life is introduced not in the era of life, but in the era of matter; this forms the second act of the *third day*, instead of being performed, as we might have expected, on the fifth day. Is not this an inconsistency? Has not Moses made a mistake in introducing life before its time? Guyot says "this is profoundly philosophical," but its philosophical aspect will be reserved to be discussed when we study its counterpart on the sixth day, for there too, a second act takes place; it is the introduction there too of life, but this time a spiritual, as

that introduced on the third day is natural. And the spiritual life seems again to have been introduced before its time, viz, in the era of natural life; whereas we should again have expected that spiritual life would not have been introduced until the era of the spiritual had arrived, viz, in the seventh period. But this will be considered more fully later.

Let us ask science whether it is proper thus to introduce a new creation by sending forward a forerunner to announce its coming. We have seen a John Baptist run before the chariot of his King to announce his appearance; we have seen angels herald the birth of the Savior, but this is in another realm altogether, and we thought sending scouts in advance was a peculiarity of the spiritual kingdom only.

Winchell tells us—"Nature has always issued her bulletins. It is a most interesting fact in the history of the animal creation that Nature advertised her plans in the very earliest creative acts. Nature had her plans, and these were mature in the very beginning. All possible contingencies being foreseen, no amendments or modifications have been necessitated by the growth of successive populations and the march of human improvement. The outlines of

Nature's grand methods were announced in her initial creative efforts. It was thus in the plan of continental development; it was thus in the plan of the animal creation. It is only in the infinite flexibility of her plans, and in the inexhaustible richness of the filling up, that Nature transcends all the possibilities of human expectation."

Here is one of those bulletins announcing what was to come on the fifth and sixth creative days, by making the introduction of the lowest form of life the second act of the third day. Moses plants the tree of life on the third day, so that it may strike its roots deep down in the inorganic period, while it is to develope and produce its fruit all through the next period, the era of life. Guyot says: "The striking fact that Moses, though fully recognizing the great difference between the two works of the third day, and importance of the vegetable kingdom, did not assign to it a special day but left it in the age of matter, is full of meaning. The plant is not yet life, but the bridge between matter and life, the link between the two ages. Placed within the material age of creation, it is the harbinger and promise of a more noble and better time to come. It is the root of the living

tree, planted in the organic globe and destined to flourish in the age of life."

But we are asking, "Is Moses scientific?" Is it scientific thus to introduce life, not in its own, but in a previous age? Dana says, "The beginning of an age will be in the midst of a preceding age. We naturally look for precursors of every age. There were Mammals before the age of Mammals, Reptiles before the age of Reptile, Acrogens and Gymnosperms before the age of coal-plant." And likewise Moses says there was life before the age of life. Moses and Dana agree.

If the reader will turn forward to the chart on page 139 this thought will be made clearer, and he will see again how scientifically correct Moses is in thus introducing life, in a way which at first sight seems to us inconsistent. It will there be seen, according to Dana, that the various classes of life follow each other through the geologic ages and reach their culmination, in a period which is named for the species which then flourishes. The first age is that of invertebrates; next above is the age of fishes, the age of reptiles, of mammals and of man. Now notice that these various orders of life, began, not in their own age, but each began in the age preceding.

Fishes flourished in the age named for them, but began in the previous age. Reptiles began not in their own, but in the previous age of fishes. Mammals began not in their own, but in the previous age of reptiles. But this rule does not hold in the case of man. The meaning of all this is, that each order of natural life began in the age preceding to that in which it flourished.

And this agrees exactly with Moses. Dana tells us that each of the subdivisions of natural life flourished in one age, but had its origin in the preceding; Moses tells us that the same law is true of life in general; that it too flourished in one age, but had its origin in the age preceding. If Moses had told us that life began in the fifth day, where we would have expected it to begin, he would have placed himself in positive conflict with science. If he had recorded—"And God said—let the earth bring forth grass, herb yielding seed etc," and entered it on the fourth or fifth day, somewhere within the era of life, he would have shown that he was neither inspired nor scientific. But the chart of Moses precisely agrees with the chart of Dana.

Still another great scientific principle appears. Life is a new thing in the earth; hitherto all

had been lifeless; the inorganic alone had existed, and had at once been placed under the dominion of law. How will it be when life appears? Moses tells us, each form of this new principle is at once placed under the dominion of law also. That is—it is God working still, as much in preserving these species of life as in creating them, but He works according to an unchangable method from the beginning. Henceforth there is to be no more special creation, but the plants are endowed with the power of perpetuating themselves. The herbs bear seeds, the trees yield fruit which enclose their seed, and each species henceforth is to go on reproducing —"after his kind." Life enjoys a new property unknown before—that of reproduction; conformity to type was impressed upon life from the first says Moses. No law is more abundantly confirmed than this; different species reproduce themselves continually—"after his kind." There is capacity of unlimited improvement of kind; the wild rose of the wayside little looks like the progenitor of the American Beauty or Jacqueminot. The great luscious clusters bursting with purple blood, are a vast improvement of the wild grape of the forest. Improvement always —"after his kind," as Moses declares. Artificial

generation can force different species to unite and produce hybrids, but if left to themselves they will invariably return again to their original stock according to the law of conformity to type. "After his kind," is one of the commandments written on nature's decalogue recorded in this first chapter of Genesis, and nature obeys her ten commandments better than does man.

The divine commendation is again received; "and God saw that it was good." Not only was vegetation good in itself, but especially as it was fitted to the purpose for which it was then introduced. It was "good," in that it immediately set about removing the excess of carbonic acid from the atmosphere and so prepare for higher forms of life, for which the earth was not yet fitted.

It would be interesting to follow geology as it traces the forms of vegetable life, especially as it describes for us the carboniferous period, when vegetation was most luxuriant, and the carbon was taken from the atmosphere and stored away in the coal measures, which like the first promise in the garden was a most suggestive prophecy and promise of great blessings as yet in the far future. If there is anything that can prove a divine plan and providence, it is the existence of coal. Certain conditions had to be fulfilled

which could occur once and never again. Not only was excessive carbonic acid gas necessary, as food for vegetation, but also the heat and moisture which existed only in the earlier ages. It was also necessary that there should be rapid changes in the earth's surface; when great forests had grown up rapidly under these favorable conditions, it was necessary that the surface of the land should be depressed beneath the water before wood had decayed, because the wood can be converted into coal only by a slow oxydation under water, or under some covering sufficient to protect it from the action of atmospheric air. Then the land must rise again to receive new forest growths, and again be depressed to lay down a new coal seam, so that sufficient quantities should be stored in any one place. The amount of vegetable matter in a single coal-seam six inches thick, is greater than the most luxuriant vegetation of the present day would furnish in twelve hundred years, as seventy-five per cent of the weight of the wood is lost by its transformation into coal. Boussingault calculates that luxuriant vegetation at the present takes from the atmosphere about half a ton of carbon per acre annually, or fifty tons per acre in a century. But fifty tons of coal spread evenly

over an acre of surface, would make a layer of less than one third of an inch. But suppose it to be half an inch, then the time required for the accumulation of a seam of coal three feet thick—the thinnest which can be worked with advantage—would be seven thousand two hundred years. If the aggregate thickness of all the seams of coal in any basin amount to sixty feet, the time required for its accumulation would be one hundred and forty-four thousand years. In the coal measures of Nova Scotia are seventy-six seams of coal, one of which is twenty-two feet thick, and another thirty-seven. The "Mammoth Vein" at Wilkesbarre, Penn., is twenty-nine feet thick.

Thus the Infinite not only removed the carbonic acid from the atmosphere and so prepared for the coming of man, but He prepared in a still more remarkable way, by storing up for his future use that which should be the very cause and means of his christian civilization. It will be seen on the slightest reflection that this marvelous century could not have become what it is, without the use of coal. That wonderful genie, more wonderful and powerful than any of myth or story, which is evoked from the impassive water, would not have come forth in such

strength and continuance to turn all the wheels of industry, and push our steamers, and print our books, unless nature had filled her cellars with the black food on which steam can feed. But who told nature that such a being, who could use coal, was to be born in the far-off centuries? And who told nature, that thousands of years after man had appeared, necessity should arise for this carbon which, was worse than useless in the then atmosphere? Nature is never provident, she is wastful; nature is never thoughtful, but pursues her wonted way unconcerned of what may be thousands of years hence. In the provision of coal there is as certain proof of kindly care, as there is in the dinner which the hungry child finds has been made ready for it when it returns from school. The coal was as much planned and provided for the nineteenth century, as the timbers which are cut and sawed in the far-away forest, were planned for the ship that is building down on the sea-board. And we who can look back upon all the work which was then transpiring, and who know what vegetation was then preparing for us, can join heartily in the divine commendation and say—"it was good."

But now candor compels us to acknowledge a difficulty, which has not as yet been satisfactorily

removed. Moses says that the highest forms of vegetable life appeared on the third day, while geology says that there are no fossils of these highest forms such as the fruit tree and other exogens, until long after the time indicated in the record. The question at issue is—did fruit trees, and trees whose seed is enclosed within covering, appear at so early a date? Moses says yes, geology says no.

Different suggestions have been made to reconcile the two. Guyot suggests that Moses means to describe vegetation as a whole, and not the particular forms which appeared at different times; he describes the system of plants in full outline, as it has been developed from the lowest to the most perfect in the succession of ages, for he will not speak of the subject again in the remainder of the narrative. What Moses has to say about plants he will say then, but he does not mean that all, of which he speaks, appeared at that particular period. Dawson on the contrary, says that higher forms of life than we think, may have flourished in the earlier ages; the progress of improvement has not been continuous and uninterrupted; the fact that a certain order of plants or animals lived in one age, is no proof that a better state of things may not

have existed in a previous age. The conditions for plant life were certainly much more favorable then than now, and therefore, even higher forms of plant life than any that we are familiar with may then have existed. The fact that they do not exist now signifies nothing, for we know that whole races of animals have been swept out of existence, leaving no successors. Furthermore, we know that each form of life reached its highest development in the period when it was dominant. For instance, when fishes reigned supreme, they reached greater proportions than at any subsequent period. Reptiles were the monarchs in the period named for them, and were then much larger and more ferocious than at any time since; so of land animals. Now if that be true of animal life, why may it not be true of vegetable life, that not only did the highest known varieties of plant life exist in the period mentioned by Moses—fruit trees and all trees whose seed is enclosed within its fruit, but even higher forms than any that have survived, because then was the period of special plant development?

And yet, it must be said on the contrary, that the rocks show no such fossils, as they ought to do if these had existed. There cer-

tainly is a difference between the testimony of Revelation and Science on this point, and it is only right that we frankly acknowledge it, and then wait until more light upon the reading of the Book or of the rocks, shall bring them into perfect agreement. We want no plausible reconciliation, this suggests that the two have been enemies; we shall be satisfied with nothing less than the perfect agreement and concord of life-long friends. All that the Book contains has not yet been learned, and surely all that God has written upon the rocks has not been deciphered. More and more as the two have been studied in the past, have they been found to be in perfect accord; if one more point remains on which they have not yet been read alike, we have the right to expect from all the history of the past, that this point also will melt away, if we patiently wait for more light. Some day science will flash such light upon this passage as will make it stand out bright and luminous; somewhere in the archives of nature, is hidden the illustration which will fully explain this, as yet, dark passage. All of us remember when geology was supposed to contradict Genesis at almost every point. One by one, these points of disagreement have disappeared by the labors of sincere

and reverent scholarship; more and more the wonders of this chapter are coming out to astonish the world; depth beyond depths is found in this record, as one age continues after another to explore its contents. And this proves it to be the work of God. The telescope, the microscope, the scalpel, the retort find inexhaustible depths of meaning where previous ages saw nothing; if this first chapter of Genesis be the work of God, we should expect the same of it. And we do find it so. This age has found far more in it than has any previous age; the next age, if it be studious and reverent, shall yet discover more than have we. We have not yet read all. And if there be still an apparent disagreement between the Bible and our Science, let us acknowledge that the error must be, where we have found the errors of previous ages were, not in the Book but in our reading of it, or in our interpretation of nature. On this point therefore, viz, the early introduction of the highest forms of plant life, we will frankly admit that more needs to be known, before we can read the two testimonies alike. But let it be remembered, that in the great scientific principles which have so far been discovered in the record, there has been found to be perfect agreement in all, until

we come to this. Perfect agreement on all the other points, most plausible reconciliation on this; but as reconciliation is not agreement, we prefer to let the divergence stand unreconciled, until the dawn of perfect accord shall shine upon it to melt away the mist.

CHAPTER VI.

FOURTH CREATIVE DAY.

And God said—let luminaries be in the expanse of the heaven to divide between the day and between the night, and let them be for signs and seasons and for days and years; and let them be for light in the expanse of the heaven, to give light upon the earth: and it was so. And God made two great lights, the greater light to rule the day, and the lesser to rule the night; he made the stars also. And God set them in the expanse of the heaven to give light upon the earth, and to rule over the day and over the night, and to divide the light from the darkness; and God saw that it was good."

Here too, as everywhere in this chapter, we must read carefully what Moses has written. As translated in the Authorized Version, it might seem that the command was that the luminaries should now appear for the first time; but the Hebrew gives no such meaning. Literally it reads—"And God said—let luminaries be in the expanse of the heavens, *for the separating* between the day and between the night;" that

is, it is not the fact of their creation or of their appearance which is stated; but simply the purpose, which those luminaries are to fulfill. Indeed the creation of the sun and the moon, as of marine vegetation and of protozoan life—all this is not touched upon at all. Moses, like the United States survey corps, has simply indicated a few salient points, from which to triangulate and give the general bearings, but has left the intermediate spaces to be surveyed by those who shall follow after to fill out the details of his great map. It is with the earth wholly and the things that are upon it, with which the record has to do after the prologue; it is not giving any astronomy of the heavens, nor of any biology of by-gone orders of life.

Far back in his narrative, Moses told us that motion was imparted to the etherial fluid, which filled all space, by the Spirit of God, and according to the laws then imposed, the nebula hypothesis explains how the luminous matter concentrated into constellations and suns and planets and satellites. That Moses could not have meant to refer to the creation of the sun and moon, might have been seen at once, if students had regarded him as scientific; this would have been out of line with the rest of his record, for he

is confining himself wholly to the earth. What took place on the fourth creative day, could therefore not have been something up in the heavens at all, but something upon the earth. What was this change?

It has been thought by many, that up to this time the earth had been enswathed in dense clouds since the hot steam had begun to condense into vapor, which entirely cut off the light of the sun and moon and stars; gradually those clouds thinned out, until at the time of the creation of the plants on the third day, there was enough light that could struggle through, to minister to the necessities of plant life, as on a cloudy day at present. But now, on the fourth day, the clouds at last broke away and the sun and moon and stars appeared in the sky. But would so small a matter as the breaking up of the clouds, be worthy of a whole creative day? Besides, the highest forms of plant life, such as the fruit trees, could not have thriven without the direct rays of sunlight. And further, simply the clearing away of the clouds and bringing in of the light of the sun and moon, could not possibly be the cause of the seasons, of days, or years. Up to this time, the record seems to imply there had been no seasons, and whatever the change

which now took place, it was for the purpose of creating seasons. Neither could the mere absence of clouds, create any signs by which the years could be marked off. So small a cause as the clearing off of the clouds, is not adequate to such great effects as were to be produced on the fourth day.

Just here Prof. Warring argues elaborately, and to the mind of the writer, most convincingly, that a great change took place in the earth itself. Remember what was to be accomplished—to divide between the day and between the night, and to arrange for seasons, and create signs whereby the seasons and days and years should be known. All this could be produced, says Warring, only by the inclination of the earth's axis. Let us here recall what we learned at school. The days, we know, are caused by the rotation of the earth on its axis, so that for half of the time one hemisphere is brought into the light of the sun, while the other is turned away and is therefore in darkness. The years are caused by the revolution of the earth in its orbit around the sun; it takes 365¼ days for the earth to make this circuit and return again to the same spot in the heavens. But neither the earth's rotation nor revolution can cause the

seasons. If only these two motions affected the earth, there would be no change in the climate throughout the whole year, and there would be no difference in the length of the days and nights. In our latitude, it would be perpetual Spring, and the days would all be of the same length, as also the nights. There would be no signs, by which we could know when one year closed and another began, if there were no seasons, and we should have to depend upon astronomers to tell us when to measure off another year; we should soon lose account of dates, and chronology would be impossible. But what causes all this beneficent change, without which life would stagnate? It is the inclination of the earth's axis, because instead of being perpendicular to the plane of its orbit, it is inclined at an angle of 23½ degrees. Because of this inclination, our northern pole is for a part of the year turned toward the sun, so that the sun's rays fall upon the northern hemisphere more directly, the days are longer, and we receive more heat; it is then summer with us, while it is winter in the southern hemisphere. Six months from that time, the north pole is turned away from the sun, the rays fall upon us more obliquely, the days are shorter, we receive less

heat, and it is winter with us, but summer at the antipodes. Half way between these two points is Fall on the one side and Spring on the other. Thus we have the changes which make our seasons; make the difference in the length of days and nights, and we have the signs by which every one knows when the new year begins, and accurate chronology is possible to all.

Now recall once more, that we have accepted LaPlace's nebular hypothesis, as do scholars generally. The earth was thrown off from the sun in the form of a ring which broke up into a spiral, that finally settled down into a great globe, revolving upon an axis of its own. But this axis must at first have been parallel to the axis of the sun, and if so it must have been perpendicular to the plane of its orbit. Mathematical demonstration proves that the earth must have started off on a perpendicular axis, that is, one exactly parallel to that of the sun; it could not have been otherwise. The motion which the earth received from the sun, must have been in exactly the same direction which the sun itself had, because the sun could impart no other, and the earth could not of itself change it; the earth had to continue as it began, until some great cause should come in to produce a

change. But that motion must have been a revolution on an axis perpendicular with the plane of the orbit around the sun.

We find however, that the earth is not now revolving upon a perpendicular axis, but upon an inclined axis. A great change has taken place sometime between the beginning of its separate existence and now, for it is now inclined at an angle of 23½ degrees; when did that change take place? On the fourth creative day, says Warring, for then Moses declares took place those effects which this inclination alone can produce; it is this inclination which causes the seasons, which makes the difference in the length of the days and nights, and which gives us the signs, by which all can know when the old year ends and the new begins. But if the nebula hypothesis be true, it is mathematically impossible that this inclination could have existed at the beginning of the earth's existence.

This view is corroborated by geology. Geology finds that up to a certain period in the earth's history, "there were no zones of climate;" the fauna and flora were not confined to certain belts, as now, but the same plants thrived at Spitzbergen, which is almost the northernmost land discovered, and which is now covered with

immense glaciers, and where a few diminutive plants spring up and mature in a month or six weeks of the summer, whose mean temperature of its three summer months, is only two degrees above the freezing point;—the same plants once thrived in Spitzbergen as did in Florida. Dana says "The coal beds of the Arctic, are evidence of a profuse growth of vegetation; through the whole hemisphere, and we may say world, there was one uniform type of vegetation, and there were genial waters." The conditions of life in latitude 70° to 80° were the same as those in latitude 30 and 40 ; that is, the climate of the most northern boundaries of Greenland, was like that of the United States between Illinois and Texas.

Now consider what all this means! It means that a great change has occurred between that time and now, a change in the cause of climate. What is the cause of climate? The ice and snow of upper Greenland do not produce the cold, but are produced by it. What makes this extreme cold? It is the long night of four months of darkness with two more months of twilight, during which there is no heat received from the sun And what makes that long night of nearly six months? Of course it is the incli-

nation of the earth's axis, which causes the north pole to be turned away from the sun, so as to receive none of its direct rays during half of the year. But there was a time when it was not so, for the plants and animals which can live only in warm climates, then lived far up to the north. At that time there could have been no long cold night of six months, as now, because these tropical plants and animals could not have lived under such conditions. But if it be said, that it was the earth's own internal heat which raised the temperature sufficiently high, yet the long nights of six months would still make it impossible for these flora and fauna to survive. If the axis had then been inclined as now, there could not have been the luxuriant growth of forests to produce the excellent coal which is found at Spitzbergen, for such forests could not have grown where six months of the year are night, and where for two more months the sun is but a small distance above the horizon. So that by the demonstration of science as well as from mathematical deductions from the nebula hypothesis, there must have been a time when the earth did rotate on perpendicular axis; but it is not so rotating now: a great change must have taken place. When? On the fourth creative day.

Then God spake, and some causes for tipping the earth must have conspired either rapidly, or, as we usually find, slowly through the long centuries. When the axis had been so inclined, then the sun and moon would do as commanded to do in the fourth day; then they would be for signs and for seasons, and for days and years. Then for the first time, the seasons would regularly follow each other; then they would divide the time between the days and between the nights, giving the most now to the day, and now to the night; then they would give the signs which were necessary, so that we might mark off the years, which otherwise would glide away as unseen and unknown as the precession of the equinoxes. Then too, the plants and animals, which could have existed in the upper latitudes while the earth was revolving on perpendicular axis, must have perished, as we now find them to have done, and all would be cold and still, covered only by immense glaciers.

"And it was so." Our observation confirms the record, and we find it is so. Now life ceases to be one continuous and monotonous existence, as it would have been if the axis of the earth had not been inclined. The 21st of

March would have stretched on monotonously until it met the 21st of September; all would have been unvarying Springtime with us, without summer or winter; the days would have been exactly equal, and so would have been the nights; no long days of summer in which to watch the gorgeous sunsets and enjoy its pleasures; no long evenings of winter, with their blazing fires and the happy fireside; no vigorous growth and rich fruitage of summer, and no tonic and recuperation from the winters cold. But now the inclination of earth's axis has taken place, and our life is varied and full of change, and consequently vigorous and active.

A negative accuracy occurs right here which must not be overlooked. This record has come down to us through the hands of Jews, for whom it was first prepared. But with the Jews, the most important measures of time were the week and the month. Every week brought them back their holy Sabbath day of rest, when all work was prohibited. The month brought them their festivals and feasts, which were faithfully observed. But strange to say, as the ancient Jew must have reasoned, there is no mention of their most important time measures. Days, years and seasons are mentioned; why did not Moses em-

phasize the most important periods of all—the week and the month? Because, he would then have been most unscientific. The seasons, and days, and years are measured off by the earth itself, but not the weeks and months. If he had yielded to his Jewish prejudices, he would have committed the first scientific blunder in the record, and so have brought it into discredit; but here the same accuracy is found in what is omitted, as in what is given.

But Moses goes still farther. He has just said what the luminaries were for, but the question will surely arise—who made them? Were the sun and moon self-originating, if so they are worthy objects of worship. Fire-worshipers and pantheists will surely make them the objects of divine homage. No, says Moses, they are not self-originative; they are not gods; the one God made them, Elohim is his name; worship Him. "He made the stars also;" do not cast the horoscope; do not consult the stars as to your future, for they cannot foretell events. "In six days the Lord made *heaven* and *earth* the *sea* and *all that in them is.*"

Great perplexities have arisen from adding to what the record gives, which has then made it seem full of errors; but the fault is then, not

of the record, but of the additions which have been gratuitously made. It has been supposed, for instance, that Moses intended to say that the sun and moon were created on the fourth day, when the fact is that he has said nothing whatever about their creation. Sometimes the translators have made these additions which have lead the English readers astray. In the 14th verse, the translators have added the word —"there"—which is not in the original at all; "and God said—let *there* be lights in the firmament of the heaven," and this has led to much confusion. If we will read the account as given, no difficulty will be met. Moses simply intends to assign the purpose, which these luminaries are to fulfill, viz. to divide between the day and between the night, etc., and so the record reads, if we will adhere closely to what has been written. "And God said—let luminaries be in the expanse of the heaven for the dividing, between the day and the dividing between the night, etc.;" not their creation, but their object and purpose are here given. And likewise in the 16th verse, another gratuitous difficulty has been made, as though it was stated absolutely, that "God (then) made two great lights," whereas the purpose only is given, viz, to rule the day

and the night, and this is clear, if read connectedly—"and God made two great lights, the greater to rule the day, the lesser to rule the night." But what about the stars? "He made the stars also." Most of the difficulties with the chapter, have risen from reading into it what is not there, or from failing to note carefully what is said, and so the words have been robbed of their precise meaning.

But is the purpose which the sun and moon were to fulfill, worthy of so great a creation? "And God set them in the expanse of the heaven to give light upon the earth, and to rule over the day and over the night, and to divide the light from the darkness." Can it be possible that all that the sun and the moon were created for, was to serve this little earth of ours,when ours is not by any means the most important planet in the system? Our planet receives only one two millionth of the sun's rays of light and heat, and so far as we are concerned, all the rest are lost. It seems therefore that a scientific mistake has here been made, for it cannot be conceived that God would create the sun for a purpose which causes the loss of nearly all its benefit. But this objection again reads into the record what is not there. It assumes that Moses is in-

tending to tell us all that the sun and moon were created for, when the truth is that he has carefully explained all along, that he is describing only what concerns the earth. The author has not undertaken to tell us about the heaven, except as this concerns the earth; he has told us nothing concerning the sun, neither the manner of its creation, nor the time, only as it relates to that which is being fitted to become the abode of man. So far as Moses has said to the contrary, the sun may have a thousand other purposes to fulfill toward the other planets, and the starry heavens. All that is here given, is what the sun does for the earth, and that is to give light and therefore heat; to divide between the day and between the night; to be for signs and for seasons, and for days and years, and to rule over the day. What other purpose does the sun accomplish in relation to the earth? If Moses was giving us a treatise upon astronomy, we might easily convict him of error; but when he is confining himself strictly to what relates to the earth, what mistake has he made either in assertion or in omission?

"And God saw that it was good." How good this arrangement is, may be somewhat realized upon a little reflection. Whatever was caused

to begin on this fourth day, whether the change in the earth's axis or something else, this certainly did begin according to Moses, viz, the seasons. But the seasons include not only the variety of conditions, so that life shall be more agreeable, but also the change in temperature and moisture. To sustain life on the earth, it is necessary that there shall be relatively the same amount of heat every year to produce and ripen our harvests, and the same amount of rainfall, which in this section of the country is about 40 inches annually. It could be easily imagined how greatly this equilibrium could be disturbed; indeed it is one of the proofs of the direct, preserving care of God, that the amount of our annual heat and rain are so even and regular. The heat at the sun, mounts up to a hundred thousand degrees; the space between the sun and the earth, has a temperature hundreds of degrees below zero. But the temperature on our earth must be confined within the very narrow limit of a hundred degrees. To maintain life here, the temperature must not generally range above 135, nor below 35. A few degrees more or less of heat, or a few inches more or less of rainfall, would seriously interfere with our harvests, and completely demoralize

all our operations. That we may live at all, and especially live happily, it is necessary that the nice balance of heat and moisture shall be carefully preserved. And this is done by the seasons. The thermometers and measures are carefully and constantly consulted by nature, and the general average maintained. If we stop to consider that our present environment must be strictly and invariably preserved, that our lives may pass smoothly and peacefully, we can but reaffirm the divine commendation and say—it is good.

CHAPTER VII.

FIFTH CREATIVE DAY.

"And God said—'let the waters swarm with living creatures that creep, and let fliers fly above the earth, on the face of the expanse of heaven; and God created great sea monsters, and every living creature that crawls, with which the waters swarm, after their kind, and every winged flier after its kind; and God saw that it was good. And God blessed them saying be fruitful and multiply, and fill the waters in the seas; and let the fliers multiply in the earth."

The earth's crust is a bound volume, having as many leaves as there are strata. This volume is nature's great herbarium, in which she has preserved either the fossils themselves, or their imprint upon its pages. The leaf or grass fell in the soft mud; the fish, animal or bird laid down its body, which the waters reverently buried, and then the coffin was turned into rock and became the sarcophagus, where these remains have been safely buried and preserved, until the geologist opens that sarcophagus with his exploring hammer, or the quarryman irreverently

blows up this sealed tomb with his dynamite, and there are the skeletons, or their imprint to show us what kinds of life prevailed on the earth at the time when these several strata were deposited. It only remains now to determine the relative time, when those strata were laid down, and we can easily read backward this accurate and illustrated history of the earth's past. Often, instead of the skeleton itself will be found the footprint of the animal which had stepped on the yielding soil to seek its prey or indulge in its clumsy gambols, or where the bird had walked on the muddy beach, whither it had come to drink or bathe. Like the clay tablets found in the ruins of Nineveh, on whose soft surface the strange hieroglyphics had been impressed, which were then baked so that these records still read to us the events of the long past, so these tablets of nature also preserve for us the hieroglyphics, by which we can read the history of the life which then prevailed, and before they passed away, left their biographies for us in the rocks.

Dana says, geology applies only to the last of the third creative day, to the fifth, and to the sixth. Guyot says—"The fifth and sixth days offer no difficulties, for they unfold the succes-

sive creation of various tribes and animals which people the water, the air and the land, in the *precise* order indicated by geology." We should have expected just what Guyot tells us, for we have seen that the record, thus far has given us the events in the precise order indicated by science in general.

We are now approaching the great temple in which Life is to be enshrined—the temple for which the earth has been preparing through all the previous ages. The beautiful portico we entered on the third creative day; now we are to cross the threshold and stand in the presence of that wonderful, mysterious thing we call sentient, volitional Life. At first, it will be in the outer temple into which the fifth day will introduce us, where the Levites of the lower orders stand, and minister, and furnish forth the table with the bread, and fill the lamps with oil. On the sixth day, we shall enter in still farther, where the higher orders of priests serve, and finally we shall enter the holiest of all, where the High Priest of nature—Man—passes behind the veil, to worship and commune with his God, but yet not without blood, "the blood of a Lamb, without blemish and without spot."

This great creation of sentient, volitional life,

is also described with the word—bara. Three times we meet this suggestive word, in this chapter, first when original matter was called into existence out of nothing; second, when animal life which is the first and lowest form of real life, is put forth on the earth; third when man is made in the image of God, and is endowed with a spiritual nature, the breath of the divine Spirit. Far back in the record, when motion was to be imparted to matter, the Spirit of God—"moved upon the face of the fluid;" but when man is to be endowed with something, which mere matter cannot have, with something more than motion, even a moral nature, then it was by the breath of God.

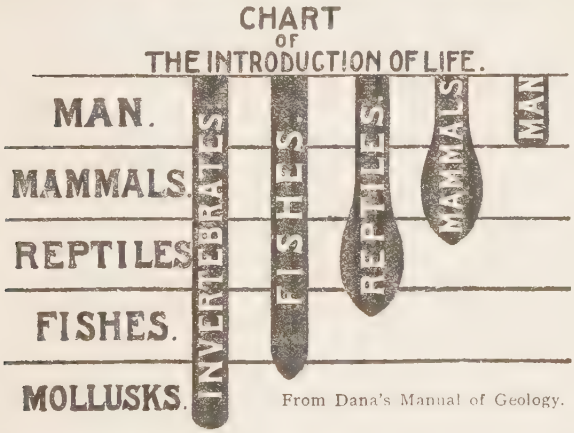
Plant life is only half life; it has the power of organization, as distinguished from the power of crystallization, but it has no motion, no volition, no brain; the plant is therefore only the perystyle to this temple, and the word "bara," is not applied to it. "Bara" indicates original creation, something called into being which had not existed before. Matter is not eternal, but is called into existence by the command of God; therefore "bara" is used. There is no such thing as spontaneous generation; life cannot be evolved out of non-living; God created it, and again—"bara,"

Man cannot be evolved out of the lower creation; the human spirit is not a development of the animal soul; the endowment of a nature in the image of God, is not reached from below, but is a new creation of God, and is again expressed by—"bara." It is remarkable that these three instances in which this special word is used, are exactly the points where science acknowledges that it knows nothing to the contrary, and can know nothing Science assumes a basis of a creation; it must have a starting point, and after that, it can proceed step by step; but of that starting point it can assert nothing. That starting point is described by this mysterious word—"bara." Again science finds a gulf which it cannot pass, at the point where "bara" is again used, viz, at the introduction of life. Many and repeated attempts have been made to obtain a spontaneous generation, where even the slightest and lowest form of life shall come forth directly from non-living matter, Some physicists have at times thought they had been able to accomplish it, but Mr. Huxley acknowledges that where the water has been carefully boiled so as to destroy all possible germs of life, and where the experiment has been hermetically sealed, so that the atmosphere could communicate no living

germs, every such attempt has proved most conclusively that spontaneous generation is impossible. At this stage, Moses brings in the direct creation from non-existence by "bara." And at that still more mysterious point, where animal life joins on to divine life; where a moral nature is discovered, where a conscience feels the sense of—"ought," where right can be distinguished from wrong, where the happy possessor of this nature can pray, can hold intercourse with the invisible world,—at that point again, science steps back and bows in the presence of this mystery, but can explain nothing; and this also is described by "bara." The origin of matter, the origin of volitional life, and the origin of a moral nature, are all a direct and new creation of God; and this Moses indicates by his triple use of—"bara."

The record now tells us not only of the introduction of animated life into the world, but of the order of its introduction. Here will be the crucial test; can Moses successfully meet it? On the question of the order of the introduction of life, geology can speak with positiveness; it knows precisely what species came first and what last. On the next page is a chart giving the known order, which was prepared

with no thought of this first chapter of Genesis; if Moses does not agree with Dana, then so much the worse for Moses, because Dana is correct. According to geology, the first order of life that was introduced was the general class of invertebrates, which includes the three sub-orders of mollusks, radiates and articulates. The



From Dana's Manual of Geology.

next class was that of fishes, then of reptiles, mammals, and lastly man. Birds, which are not given on the chart, were introduced between the age of reptiles and that of mammals, but birds and insects did not reach their culmination until the age of man. The horizontal bands on the chart represent the ages in succession; the vertical, which are black, correspond to different

groups of animals, and give the relative time of their introduction, as also the periods of their culmination.

Does the chart of Moses agree with this? It will now be necessary that we learn exactly what Moses means in his classification, and we must read him with the same rigorous precision as we do a geologist. It will be necessary therefore, that we examine his terms very closely and get at their root meaning, as well as the meaning which they have elsewhere. Literally the 20th verse reads—"And God said—let the waters creep with creeping things of life, and let winged creatures upon the earth, wing upon the surface of the expanse of the heavens." By the first is of course understood that the waters shall be full of these creeping creatures, or swarm with them, but the root idea is that they creep. In Lev. 11: 20-30 various kinds of these are given, but it must be noticed that they all creep, and are those which are exceedingly prolific, as for instance—grasshoppers, locusts, lizzards and snails. Now Moses says that it is the waters which bring forth these creatures in such swarms and not the land or the air. The class, which he says first came forth, had three charactersitics —they were water animals; they swarmed in

such swarms as to make the water fairly "creep" with them; and they creep or crawl. Science has a more specific name for the animals that first appeared, and calls them—invertebrates. But these also were water animals; they were exceedingly prolific, but the first invertebrates did not creep.

As will be remembered from what was said in Chapter V. the first creatures that appeared were the protozoans—first livers,—but these did not creep, they were what might be called agglutinative, for like the corals, they glued their shells fast to the shells of others, and so built up the chalk formations for instance, and many limestone formations. However after the protozoan, says science came the other invertebrates, which do creep, and have power of motion, and these have all the characteristics of the animal, which Moses so carefully describes; they were water animals, they were swarmers, and they creep.

Here then is perfect agreement between Genesis and science as to the class of invertebrates which appeared in due time. Both say that the first class was the invertebrate; but science says those which appeared the very first, did not creep. Very well, says Moses, I am speaking of invertebrates too, but I am not speaking of

the first class that ever appeared; I have not descended to these particulars, for I am not giving a text book on zoology, but am giving a rapid sketch of the history of the earth. The order of the introduction of life was first invertebrates, but the subdivision to which I refer, was not those minute animals which have no power of motion; the first subdivision of invertebrates with which I begin, is that immense class which do have the power of motion, the creeping creatures. We can see at once why Moses inserts that discriminating word—"creeping," for if he had not done so, he would not have been scientific. The protozoans had long preceded even the rise of the dry land above the ocean; they are supposed to have begun in the later part of what is called the Azoic age, that is the age which was lifeless except for these minute animals. It is of the fifth day animals of which Moses is speaking, and if he had not inserted that qualifying word, but had said that animal life in general began at this period, he would have been found to have been in error by later science. The animals which began life on this fifth creative day were invertebrates, but they were distinguished from those minute forms which preceded them by having true power of

locomotion. Put in the word which Moses inserts, and he is exactly in agreement with science; but overlook the scientific value of—"creeping," and you bring Moses into conflict with science.

The invertebrates, thus introduce the great order of general animal life on the earth. But there is a general class of life, also animal, which is not strictly on the earth, but above it. Moses says the command was to the winged, as well as to the creeping creatures, to come forth; and it was so. This 20th verse therefore is a general introduction of creeping life, and of winged life, both appearing on the same day, but the creeping before the winged, which is perfectly correct. What these winged creatures were, the record does not tell us, but biology says they were not birds, for these appeared later. Moses is laboring at a greater disadvantage than modern scientists; he has no strict and scientific nomenclature at his command. The word he used, is simply one that expressed something that flies, whether a vertebrated bird, or insect or even a flying reptile. Next after the water swarmers, which science specifies as invertebrates, are flying things, and this is perfectly correct as seen by the table of Mr. Huxley on page 147.

After the invertebrates, says science, came fishes and reptiles; and Moses says the same—"and God created great sea-monsters and every creature that crawls, with which the waters swarm." Still the creatures are water animals, but of a higher order. This class has been subdivided, for convenience into the two orders of fishes and reptiles, but so closely are they assimilated, especially back in the beginning of animated life on the earth, that it is often difficult to tell which is strictly a fish and which a reptile. Dana says—"These early fishes have strong reptilian characteristics, and they were thus comprehensive types, foreshadowing the class of reptiles afterwards created."

Confirming what Moses said, that the fishes were—"great sea-monsters." Dana, speaking of the fishes of the Devonian age, says—"The earliest species, therefore, instead of being the lowest of fishes, belong to the highest of the three great divisions; moreover, instead of being small, some of them were twenty or thirty feet long; one class —the Selachians, is the highest among fishes, even in modern seas." So that the record is correct in the order of the introduction of these species of life, and it is also in describing them as—"great sea-monsters." The Icthyosaurs, for instance,

"were gigantic animals ten to forty feet long, having paddles somewhat like the whale, long head and jaws, numerous (in some species 200) stout teeth, and an eye of enormous dimensions; more than thirty species are known to have existed in the Reptilian age." The Plesiosaur had a long snake-like neck, a small head, short body, very like that of a swan, and from twenty-five to thirty feet long. In the great central sea which then covered the plains of Kansas, swam a species of great sea-monsters which attained a length of eighty feet and more. Dinosaurs sometimes reached a length of fifty to sixty feet.

The Iguanodon was an herbivorous Dinosaur, and had the habits of a Hippopotamus; it was thirty feet long and of great bulk. In this age, the reptile approached the bird form, as the Pterodactyls, were immense bat-like creatures, measuring as much as twenty-five feet from tip to tip of wing. Could Moses have been more correct in his description, than by saying—"and God created great sea-mosters and every living creature that crawls," for what distinguishes a reptile from a fish, is that the former crawls while the other can only swim. And Moses says that those which crawl came after the great sea-monsters. And further, all these are as yet

marine animals, or as the record puts it—"with which the waters swarm." "Up to the time of the carboniferous formations, nearly all life was marine, or if not entirely so, required the ocean or some inland sea for its development and existence. But toward the time when the Permian strata were being deposited, a marvelous change took place; the earth and rivers and seas swarmed with reptiles, and the air was darkened by huge flying monsters, half reptile, half bird. It was as if the sea had poured out upon the shores its store of life. So prolific was this period with saurians, lizards and reptiles, as evidenced by the fossil remains, that geologists have called it "the great Reptilian era."

After this comes again, according to the record, the "winged flier." The nomenclature is not scientific, nor does Moses enter into the details, or give subdivisions; he is only tracing general outlines and leaves it to science to fill them out in the future ages. Science is a true interpreter, and so she explains that, while the expression—"the flier that flies" in the former verse, meant insects, it now means birds and pterodactyls.

A most remarkable confirmation of the scientific accuracy of Moses is given by so competent

ACCORDING TO HUXLEY		ACCORDING TO MOSES.
FORMATIONS	FIRST KNOWN APPEARANCE OF	FIRST APPEARANCE OF
Quarternary Pliocene Miocene Eocene	Vertebrate air population (bats)	
Cretaceous Jurassic Triassic	Vertebrate air population (birds and pterodactyls)	"winged fliers after their kind"
Upper Paleozoic Middle Paleozoic Lower Paleozoic	Vertebrate land-population (amphibia, reptilia)	"living creatures that crawl"
Silurian	Vertebrate water-population (fishes)	"great sea-monsters"
	Invertebrate air and land population (flying insects and scorpions)	"fliers to fly above the earth in open expanse of heaven"
Cambrian	Invertebrate water-population (much earlier, if Eozoon is animal)	"waters swarm with living creatures that creep"

an authority as Prof. Huxley, which is all the stronger because it is undesigned.

Mr. Huxley is conducting a controversy with Mr. Gladstone in a series of articles in the "Nineteenth Century," in which his purpose is to show that the first chapter of Genesis is in conflict with science. Instead, however of asking what Moses really did say, he accepts the inaccurate translation, and the false conclusions which unscientific centuries have read into the record, and for these he holds Moses responsible; then easily showing that these are untrue, he claims that Genesis is untrue. Afterward he proceeds to show what is the correct order of life, as learned from the earth's strata, and puts it in the form of a table as given on opposite page.

Mr. Huxley explains—"The series of the fossiliferous deposits, which contain the remains of the animals which have lived on the earth in past ages of its history, and which can alone afford the evidence, required by natural science, of the order of appearance of their different species, may be grouped in the manner shown in the left-hand column of the accompanying table, the oldest being at the bottom. In the right-hand column, I have noted the group of strata, in which, according to our

present information, the land, air and water populations appear for the first time."

Now if we take this table, whose design is inimical, and compare it carefully with what Moses did really say, as shown in the third column, we shall see, that so far from being in conflict, Huxley and Moses are in complete concord. So far from accomplishing what was intended, the table most wonderfully confirms Genesis, and as this is the testimony of an unwilling and even hostile witness, its weight is all the greater. It will be seen however that Mr. Huxley does not give a complete table of animal life, but only as far as the purpose of his argument requires; all the herbivora and carnivora, as well as man, are not included.

"These empires, named for the species that were then monarchs, rose upon the earth and crumbled in succession to decay, a thousand ages before the foot of man had yet pressed the soil of the garden of Eden. A series of dynasties flitted like shadows over the face of our planet, and disappeared beneath the dim horizon of the past, while the empire of man, was yet but an idea in the mind of the Creator. Here were morning and evening, invigorating sunlight, cooling dew, softly wooing breeze and fierce-

ly maddened tempest, springtime and autumn, weeping clouds and placid evening sky, ocean surges waging everlasting battle with the rocky shore—and God alone the spectator of the progress of the mighty work which was then being accomplished. How the imagination halts and faints and falters in the effort to traverse those dim and distant ages! The ignoble mollusk held dominion in the sea, through all the morning twilight of animated existence; the mute fish reared his empire on the ruins of that of the mollusk, in turn the dynasty of the fishes was superseded by that of the reptiles." But all these changes went on in exactly the order portrayed by Moses; the chart of science has followed precisely the chart of revelation, for the record on the rocks must agree in all things with the record made in the Book, for both are true.

Again is added the expression of the divine approval—"and God saw that it was good." This does not mean that these grades were the highest and best, or were to remain, for at the close of the Carboniferous age, there was a complete extermination of all the then living species, which made way for higher forms. The divine commendation signifies that the new work

which had just been completed, was good in view of the function it had to perform. As creation proceeded, everything looked forward toward a great end; all these forms of life, pointed as with index finger—saying something better is to come, something better is yet to come; we are but the advance guard in ascending grades, to announce the coming of our king. Not only in the preparation of his kingdom, but in bony structure and in advancing grade of life, each one rising higher than the last, there was an anticipation of man. As all the converging lines of a rising pyramid plainly prophesy of the time when the top-stone shall be reached, so all the stages of creation clearly prophesied of the time when the top-stone of this pyramid too should be brought forth, amid the acclaim of the morning stars and the congratulatory song of all the sons of God.

For the first time God blesses this new work of his hand, because only life that has sensation can appreciate a blessing. The blessing contained not only the power of fruitfulness and multiplication, but there was in it the capacity and the permission of enjoyment. The Creator, did not intend that life should mean simple existence, but He endowed anima-

ted life with sensation, and this was to be gratified. That his blessing has been fulfilled is clearly seen, not only in the fact that the sea has been filled with life, and the air with flying things, but also in the very manifest enjoyment which all these creatures seem to have in life. The fish are as sportive as the lambs; the insects respond to the enticing warmth and sunshine and give themselves up to delightful gratification and enjoyment.

All through the record, there have been glimpses of something which seems to be struggling to come to the surface, or perhaps we should rather say—we have almost caught sight of a something, which the inadequacy of our light or imperfection of our vision has prevented us from clearly distinguishing. From the very first, the record has said what it had to say, but men could not understand it until astronomy, and especially the telescope and spectroscope, until geology and biology gave us the eyes to see, and the ears to hear what had been there all along. This principle, which now almost suggests itself plainly, and now eludes us, is the method of creation; was it all by direct and special act of God, or was it by evolution? At each step in the record is the suggestive state-

ment—"and God said let there be, and it was so." Does this mean, not what it appears to say, not that God used co-operating causes; but when God said—"let there be light;" "let the earth bring forth;" "let the waters bring forth abundantly," does it mean that God did it Himself directly; that God created vegetation Himself, without the earth as a co-operating cause; that God created the animal Himself, without the co-operating cause of the waters? Does it mean that the command was really, not to the earth to bring forth the first plants, not to the waters to bring forth the first animals, but the command was only to Himself? Reproduction was to be "after his kind;" but when the additional blessing is added to "multiply and fill" does this mean multiplication only in numbers, but not in species? Does this mean nothing more than reproduction "after his kind", over again? The method of creation—just how God did it, seems to be struggling to reveal itself; have we as yet reached the point where we can read clearly and understand its meaning? This suggestion is more clearly made in the fifth creative day than elsewhere, and especially in the different expression used with regard to man in the sixth day, so that it can no longer be

avoided, but its fuller discussion will be reserved for a special chapter.

CHAPTER VIII.

SIXTH CREATIVE DAY.

And God said let the earth bring forth animals after their kind, the herbivora, the reptiles, the carnivora after their kind; and it was so. And God made the carnivora after their kind, and the herbivora after their kind, and every land-reptile after its kind; and God saw that it was good. And God said let us make man in our image, after our likeness, and let them have dominion over the fish of the sea, and over the birds of the air, and over the herbivora, and over all the land, and over every land-reptile. So God created man in his own image, in the image of God created He him, male and female created He them. And God blessed them, and God said—be fruitful, and multiply, and replenish the earth, and subdue it, and have dominion over the fish of the sea and over the birds of the air, and over every animal that creepeth upon the earth. And God said behold I have given you every herb bearing seed which is upon the face of the earth, and every tree in which is the fruit of a tree yielding seed, to you it shall be food. And to every animal of the earth, and to every bird of the air, and to every living thing that creepeth upon the earth, I have given every green herb for

food: and it was so. And God saw everything that He had made: and behold it was very good; and evening was, morning was sixth day.

The fifth creative day describes to us the creation of marine animals, in exactly the order which Mr. Huxley says science knows to be correct; the sixth day gives the description and order of land-animals and man, and here too the record is in perfect agreement with science. But the marine animals preceded land animals by a whole creative day, says Moses; is that correct? It is correct, says geology, for the lower animals appeared in the Secondary period, but the mammals did not appear until the Tertiary. Speaking of this sixth day, Dawson says —"It is almost unnecessary to say that this period corresponds with the Tertiary or Cainozoic era of geologists. The coincidences are very marked and striking, for though in the Secondary period of geology, when these lower orders prevailed, there were great facilities in the strata then forming, for the preservation of mammals, yet only a few small species of the humblest orders have been found. But at the very beginning of the Tertiary period, all this was changed; most of the gigantic reptiles had disappeared and land mammals of large size and

high organization had taken their place. Perhaps no geological change is more striking or more remarkable, than the sudden disappearance of numerous species of large mammals, and this, not in one region only but over both continents."

We set out with the determination to study, not traditions, nor even translations, but the record in its own original language, so it will be seen that the rendering of what took place during the sixth day, at the head of this chapter, differs somewhat from the authorized translation. Moses says there were two kinds of land animals which now appeared, and the distinction between them must be learned from their use elsewhere. Bhema, translated—cattle, in our English version, is used in a few instances as a general term for animals, but in distinction from chaytho-eretz, as here, it means domestic animals as distinguished from the wild beasts. In Lev. 1:2, Bhema refers only to the herds and flocks—"Ye shall bring your offering of the *cattle*, even of the herd and of the flock." In Lev. 11:22-27, the bhema are mentioned which could and could not be used for food, and these are strictly herbivora, while the carnivora which were also unclean, are described by chaytho-eretz, and this distinction is observed wherever these two words

occur together. Principal Dawson also translates the two words as above—viz, herbivora and carnivora.

Now if we will turn back to page 139 and look once more to Dana's chart, we shall find that the order of life as given by Moses is precisely that given by Dana, for herbivora and carnivora are both mammals. Dana speaks of the two in the general class of mammals, while Moses gives the two separately, and says that the herbivora precede the carnivora; is this correct? Dana says—"The quadrupeds did not all come forth together. Large and powerful herbivorous species *first* take possession of the earth, with only a few small carnivora. These pass away, and other herbivora with a larger proportion of carnivora next appear; these also are exterminated and so with others. Then the carnivora appear in vast numbers and power, and the herbivora also abound. Moreover these races attain a magnitude and number far surpassing all that now exist, as much so indeed on all the continents, as the old Mastodon twenty feet long and nine feet high, exceeds the modern buffalo." Here is no reconciliation, but perfect agreement. Moses wrote his order of mamalian life centuries ago, while Dana wrote his from the stand-point

of pure science, with no reference to Genesis.

Between the herbivora and carnivora Moses speaks once more of creeping things as he had done on the fifth day, and again he is correct, for a new species of reptiles now appear. Dana tells us—"the first snakes have been found in the Eocene; a species twenty feet long was discovered in the Brackelsham beds; half a dozen species, related to the common black snake occur in the Miocene." The Eocene—literally, "the dawn of the new" is the first, and the Miocene is the middle division of the Tertiary period, which corresponds to the sixth day of Genesis. The order is again perfectly scientific herbivora, reptiles, carnivora.

A difficulty however occurs here which must be honestly acknowledged, for views which depend upon ignoring uncomfortable facts cannot be reliable. In the 24th verse the order is that of science—herbivora, reptiles, carnivora, but in the next verse, this order is changed to carnivora, herbivora, reptiles. An explanation may be that the first gives the true order of creation, while the second gives the order of rank, the carnivora being larger and stronger than the herbivora, while the herbivora rank above the reptiles. But if this be not the explanation, we may be

sure that some one will come along to give us the explanation, and we shall find, as usual that the record is right.

And now the top-stone of the pyramid is "brought forth with cryings—grace, grace unto it." Man appears next, on the same day with the higher orders, but raised far above them by the endowment of a moral nature. These three facts are very suggestive, and the first two are fully corroborated by geology, viz, that man appeared last, and on the same day with the higher animals, but on the third point—that he has the endowment of a new nature, geology is not competent to speak. Says Dana—"As the mammalian age draws to a close, the herbivora and carnivora of that age all pass away, excepting, it is believed, a few that are useful to man. New creations of smaller size peopled the groves; the vegetation received accessions to its foliage, fruits trees and flowers, and the seas brighter forms of life. This we know from comparisons with the fossils of the preceding mammalian age. There was at that time NO CHAOTIC UPTURNING, but only the opening out of creation to its fullest extent; and so in Genesis, *no new day* is begun, it is still the sixth day." Exactly so; animals of the higher order and man come

forth on the same day, so says geology and so says the Bible, but how could the writer of this record have trodden amid the elaborate difficulties of that distant past, and not have made a misstep, when only the most diligent study of the rocks in this late year of Grace, has been able to clear away those difficulties, so as to read aright that testimony of the rocks?

As we look back from man's place, upon the past long history, we can see now how all was in preparation for his coming. The waters ground up the rocks to make for him a soil; vegetation removed the poison from the atmosphere and stored it away as fuel for his future use. Even geological upheavals, the rising and submergence of continents; vast wrinkles thrown up to form mountains which were burst through with irrepressible volcanic force; the crust twisted, broken, thrown into great confusion—all this can now be clearly seen to have been for the benefit of man, and a preparation for his coming. Had it not been for these upheavals, the coal would have been buried under ten thousand feet of level strata, so far away from man's sight that he would never have found it, nor dreamed that this great provision was waiting his search beneath his feet. But the coal

was tilted up on end; again and again it crops out upon the surface, as much as to say—see here, search not in vain; dig and be warm; use freely the fuel which your beneficent Creator stored away for you thousands of ages ago, and let the wheels of your industry revolve, let your literature be printed, and let it be disseminated on the wings of the wind. The metals too were buried beneath a vast amount of sediments, but by the rupture of the earth's crust, they have been thrown up to the surface and a clew is given, which man can follow to discover the vast treasures which would not otherwise have been found.

On the north shore of Lake Superior are the famous picture rocks, strange formations cut out in all manner of fanciful forms. A mile beneath these rocks, lie the rich copper ores. A fiery outburst threw this valuable metal to the surface; it did more, it reduced those refractory ores for the service of man. It did still more, it bent the flinty rocks into the form of an immense trough, heaven poured out its waters to fill it, and to-day, Lake Superior, connected with the other great lakes, floats an immense tonnage to bring us the valuable ores of upper Michigan. This same preparation is noticeable in the case of gold, iron and all the other valuable metals.

But what is more remarkable still, note the time when this upheaval took place; mark it well and then "be still and know that He is God." Had all this valuable store of gold, iron, copper, coal been thrown up to the surface in the Mesozoic period, all would have been deeply buried again, or have been washed over all the breadth of the land. Instead of that, God saw to it that this breaking of the earth's strata, and turning of them up on end should take place after all the Tertiary beds had been laid and man is just about to appear. And not only so, but nature contained a prophecy that man should be an intelligent, reasoning, worshiping creature, for recall how few of nature's resources have been discovered without study and effort. When the Creator adopted an intelligent method and a beautiful symmetry of plan, it was a sure hint that He meant to introduce an intelligent being, who should be able to respond and follow Him. And now, at last he appears; the king has come, and dominion is formally turned over to him.

By referring once more to the chart of the introduction of life, on page 139, it will be seen that all previous species had been introduced gradually, beginning in the age, previous to that to

which it gave its name; the fishes reigned in one age, but began in the previous age, so did the reptiles, and mammals, but not man; the age of man began abruptly, for he is an exception. Winchell says—"The moment that the last revolutionary visitation had come to an end, while yet the lands had become scarcely stable in their places, man seems to have suddenly made his appearance among the beasts of the earth, and to have moved among them with a conscious and uncontested superiority." That is the testimony of the rocks, but it simply corroborates what Moses said long ago. Man does step out at once, and takes dominion over the fish of the sea, over the birds of the air, and over every living thing that creepeth on the earth. By his intelligence, he is master over those which have much greater strength and speed and even cunning.

Creation has reached its finality in man; his very physical structure indicates that man is at the top. He is a vertebrate, the highest order of mammals. The lowest of this class carry the brain on a horizontal spine; as they ascend in grade the brain is held higher and the spine more elevated; the class next below man carries its brain now on erect spine and now prone, but man alone stands erect, with the brain on the

top, and physical structure can rise no higher than this.

"But beyond this, in Man the forelimbs are not organs of locomotion, as they are in all other mammals; they have passed from the locomotive to the cephalic series, that is, have been made to subserve the purposes of the head. This transfer is in accordance with a grand law in nature, which is at the basis of grade and development. The intellectual character of man, is thus expressed in his material structure. Man is therefore not one of the Primates alongside of the Monkeys; he stands alone—the Archon of Mammals." (*Dana.*)

But now man takes a sudden leap above all the other animals, so that an impassable gulf becomes fixed between him and them, in the endowment of a moral nature. He has an intelligence, whose capacity for development knows no limits. The animal has instincts, which can be educated to a certain extent, but never to the point where these instincts become human reason. A dog can be trained, so can a horse; but no amount of training would make the dog or horse capable of learning mathematics or comprehending philosophy, while there is not a child of the lowest savage, which cannot be in-

structed so as to comprehend the highest learning. The human reason, on the contrary is unlimited; man can go on developing forever and never reach the line beyond which it is impossible to go.

Man is a moral creature; he knows right from wrong, and can feel the weight of that word—ought. This moral sense is intuitive, while a lower animal recognizes a right or wrong because he has been rewarded for doing right and punished for doing wrong. Man, like his Creator, can enjoy right for right's sake; can enter into the sweet bliss which wells up within him from the fountains of an innate sense of right, without any external rewards. Man can worship and love his Creator; he can commune with Him, not only by the aid of articulate language, but by the unspoken language of the heart. He can receive the inspiration and gift of the divine Spirit; he possesses the highest and heavenliest prerogative, a capacity for God; can receive the germ of God-life, just as the tree can receive a graft of a new species and incorporate it into itself.

This spiritual life is altogether different from the human, as natural life is altogether different from crystalization, the quality possessed by the

inorganic. As chemical atoms can be so organized as to receive life, so that a material body can somehow contain a human soul, exactly so the human soul has been so organized as to have the capacity of receiving and containing a life as much above itself, as human life is above the chemical constituents which hold it. This is the new birth. Then the soul itself receives another something, we call divine life, just as the body by birth receives a something which we call human life. Christ said, unless a soul did thus exercise its highest faculty and receive this new and divine life, it would be utterly impossible for it to enter that new and divine kingdom. Nicodemus marveled at this, but as a master of Israel he should not have marveled at this capacity of the human soul, for he should have known that nothing can enter a higher kingdom unless it first be endowed with the life of that kingdom; nothing can enter the plant kingdom unless it has the plant life; nothing can enter the animal kingdom unless it have the animal life, and likewise, no one can enter the kingdom of God, except it have the life of God. This is a simple, rational necessity, which Nicodemus should have recognized. And this capacity of the new birth, this ability to receive and incorporate the divine

germ, this is the highest faculty of man, and lifts him infinitely above the animal.

Now it may seem a strange omission, but upon man the divine commendation is not pronounced, as it was upon the animal. After his appearance, it is not said—"and God saw that it was good." Is not this a reflection upon him? does not the record make a discrimination in favor of the animal? On the contrary, this omission is the highest compliment to man; it is a tribute to his greatness. Animals were created at their best; all that they could ever do, they could do at the beginning. The ant is not any wiser than it was in the time of Solomon; the dog was just as sagacious at the beginning as now, the fox as cunning. There has been no improvement among the animals, but there has been vast improvement among men, even in their fallen estate. With man there is endless power of improvement, unlimited progress; ever and forever he shall become better and still better able to serve the ends, his Creator had in view when He created man. Man was not "good," when he was created, in the sense in which this term is used in this first chapter of Genesis; he is not now, and perhaps he never shall be. That commendation expressed the

final height of attainment. Its omission was not a suggestion of imperfection, but of incompleteness; it was a suggestion that man was to "work out his own salvation with fear and trembling, for it was God that worketh in him both to will and to do of His good pleasure." Some one has said—"man is an animal with tools;" those tools are the divine endowments, and no matter how well he has used them, there is always a possibility of using them better; however great may have been his accomplishment with them, there is always a still higher power of accomplishment. Man was not created at his best even though pure and holy; he was not placed at his final state, and indeed such is his capacity, he shall never reach his final state, beyond which he cannot attain to something better. All this is impossible to the animal, and therefore at the first, God could say of it "and God saw that it was good," but this could not be said of man, because he is ever capable of something better. Dana thus admirably sums up the attributes of man—"Man was the first being that was not finished on reaching adult growth, but was provided with powers for indefinite expansion, a will for a life work, and boundless aspirations to lead to endless improvement. He was the first being

capable of an intelligent survey of nature and comprehension of her laws; the first capable of augmenting his strength by bending nature to his service, rendering thereby a weak body stronger than all possible animal force; the first capable of deriving happiness from truth and goodness; of apprehending eternal right; of reaching towards a knowledge of self and of God; the first therefore capable of conscious obedience or disobedience of any moral law, and the first subject to debasement through his appetites and a moral nature. There is in man a spiritual element in which the brutes have no share. His power of indefinite progress, his thoughts and desires that look onward even beyond time, his recognition of spiritual existence and of a Divinity above, all evince a nature that partakes of the infinite and divine. Man is linked to the past through the system of life, of which he is the last, the completing creation. But, unlike other species of that closing system of the *past*, he, through his spiritual nature, is far more intimately connected with the opening *future*."

While man was created pure and holy, he was probably as undeveloped as a child. We must not think of him however as an uncivilized

creature gathering acorns. Though he had none of the arts and sciences of our civilization, he was very far from being a savage. He had fresh and uncorrupted powers, which as in the case of a child, must have been capable of prodigious growth; he had nature, the great original of which all art is but the copy; he had God for his teacher, with whom he communed without restraint, and the effect of such a stimulus and inspiration must have been immense. We can no more judge of his progress and rapid development from our own experience under circumstances so different, than we could judge of the growth of a tropical tree, from its stunted size in the cold climate to which it has been transplanted.

The dominion which was given at once into his hands, was over the fish of the sea, and over the birds of the air, and over the bhema or herbivora, and over all the land, and over every reptile that crawls upon the earth. It is noticeable that the carnivora are not included, and when the description of the garden of Eden is given in the second chapter, the carnivora again are not mentioned. We shall never appreciate the wonders of Scripture unless we pay strictest attention to what it does not say, as well

as to what it does say. Its omissions are as suggestive as its positive statements. If the carnivora had been included among the animals over which man should have dominion, again the accuracy of Moses would be questioned.

The question cannot but be asked—how could man be safe and happy, when carnivorous and predacious creatures were created in great abundance on the same day with himself, according to both geology and Scripture? This question can be easily solved when brought into the light of modern knowledge of nature. Every large region of the earth differs from all other such regions, in the groups of animals which inhabit it; there is also sufficient reason to believe that all animals and plants have spread from certain local centers of creation. Scripture and ethnology agree, in assigning the origin of the human race to the vicinity of the rivers Tigris and Euphrates, and to this same center, we can also with the greatest probability, trace several species of the animals and plants that are most useful to man. At the time of man's appearance, this locality may have been peopled by just such animals as we know to have come from thence, such as were specially suited to association with himself. The passage in the second chapter, which de-

scribes the formation of herbivora and birds out of the ground, and which were then brought to Adam to see what he would name them, would be superfluous, unless the additional facts were intended, that these creatures thus associated with him, were only those which would contribute to his happiness and had no tendency to injure or annoy. Indeed the class which we call the domestic animals, seem to have an innate fitness for domestication, and a fondness for man's company, while other animals cannot be domesticated even after long contact. But the difficulty arising out of the fact that ferocious and carnivorous animals existed at the same time that man was in Eden, is at once obviated by the geological doctrine of the extinction of species. In past geologic ages, large and important groups of species have become extinct, and have been replaced by new groups; this process has removed many creatures which would have been highly injurious to the welfare of man. We know that many injurious animals have been replaced by others that were helpful; why cannot we suppose that this process would have continued until all the injurious animals had been so replaced, if man had not sinned? The curse would thus consist in the permission

to the predacious animals and to the thorns and briars of other regions, to invade Eden, or in man's own expulsion from the favored spot, to contend with the animals and plants which were intended to have given way and become extinct before him? Thus while the other regions were as before the appearance of man, the center whence the human race sprang, was also the center of only helpful animals and plants, which would have spread with him until the whole earth had been subdued, as we have found to be the case with many other species of fauna and flora.

A conflict has been supposed to exist between St. Paul and geology, in that it is said the former declares that there was no death in the world until Adam sinned, while geology finds the rocks filled with the skeletons of animals which perished, ages before man appeared at all. But this inference, like all others which would involve Scripture into a conflict with Science, arises from careless reading. Paul does not say that death passed upon all the world because of man's sin, but upon his own descendents; "wherefore as by one man, sin entered into the world and death by sin, and so death passed upon *all men, for* that all have sinned." Death that was penal,

extends only as far as the sin, which was the cause; the animals are not capable of sin because they have no moral nature. This high prerogative of a moral nature is capable of being positively pure and holy, but it is also capable of sinning, and must then incur the consequence of sin—death.

And now is presented, what to the writer, seems the richest, the most blessed, and most hopeful of all the suggestions this wonderful chapter has yet made. Man appears on the same creative day on which the animals were created, so says the Bible, and so says Geology. Any uninspired writer of the time of Moses or before, would certainly have claimed a special day for man; he would have put the creation of the higher animals back on the fifth day, with the other animals, and have reserved the sixth exclusively for one who deserved a whole day to himself. But then he would not have been true to science, for while man is raised far above the plane of the animals by the endowment of a moral nature, which allies him to God, yet he is created at the same time with the other mammals, with which, in his bodily nature, he is also allied.

This makes the introduction of spiritual life,

exactly parallel to the introduction of natural life. It will be remembered, that creation of natural life was the second act of the third day, so likewise the creation of spiritual life, is the second act of the sixth day. To the ordinary intelligence, this would seem to be a mistake; life of both kinds should not have been introduced until its own period; natural life should have been created in the era of life, and spiritual life in the era of divine life. But no, each is brought forth in one age, and intended to meet the fullest development in the succeeding age; each is made to strike its roots down in the one, and flourish in the next. Natural life is planted in the era of matter, but brings forth its results in the era of life; so spiritual life is planted in the era of the animal, but shall attain its true development, in the next, in the era of the spiritual.

And here let us reflect how rich, how full of blessed suggestion this fact is. Natural life becomes thus the type, or perhaps we should say, the parallel of spiritual life. Could we have taken our place back in the third creative day, and have seen life as it then was, we would have been just as little able to imagine what the immense and beautiful development of it would be

in the sixth and seventh, as now standing at the very threshold of the spiritual life, we are little able to imagine what its glorious and endless development shall be, when the new week shall have begun under "the new heavens and in the new earth, wherein dwelleth righteousness." Then the world was lifeless and bare; not a blade of grass to deck the tomb of the dead earth, not a leaf nor flower; not a bird nor animal to waken echoes of life from the hollow caverns where the cruel waters of the sea alone were devouring the rocks in their ceaseless, everlasting grind. In what form, life first appeared, neither Revelation nor Evolution have told us; perhaps a thin sparse growth, like moss or fungus, began to cover the bare rocks. Had we been there, we should have stooped down to pluck the strange thing, and then we should have tossed it contemptuously into the sea. Is this all? Is this insignificant, worthless thing that which you call life? Do you expect that from this, will develope an ever increasing series of new forms, that will cover the dead earth with verdure and beauty, that shall fill the air with winged things of gorgeous hues and delightful melody, that shall stock the world with moving, sentient creatures, ranging all the way from the burrowing

mole to the mighty mastodon, from the slimy invertebrate, to a man made in the image and likeness of God?

Compare that first germ of natural life with what has come forth from it—an earth, that were fit for the sons of God, were it not for sin. The mountains are decked with flowers, the vallies are yellow with harvests, the air is full of song, every inch of earth's surface is busy with multitudinous life; fish and insect and animal and bird and man are full of activity and gladness. And when we rise to contemplate what man has been able to achieve—cities burst forth into the blossoms of civilization, chasms are bridged, mountains tunneled, sea turned into a highway, continents webed with railroads and threaded with electric wires, distance annihilated and time itself outrun; when we see all this, and remember the first beginnings of life back in the third day, we are lost in wonder and awe.

But this is only the type of another, a higher life, which was not communicated to matter, but was breathed into man, and which was introduced as the second act on the sixth creative day. As we stand here, and look at this small beginning of divine life, again we are tempted to despise it, and ask—is this all? Is this moral

nature, which some men can hardly distinguish from the cultivated instincts of the animal; is this little germ all, upon which you say the great and immortal system of redeemed souls is built? We answer, look back to its counterpart, that was brought forth on the third day, and then behold into what infinite results it has developed; if from natural life, with such small beginning, all this can come forth, then we ask you to consider what can come forth from this germ of a divine life? As yet we see this divine life only in its first stage; as yet it has only begun to strike root into the natural, as the natural struck its root into the material. We are not yet in the era of the spiritual, when this germ of the divine can flourish; we are only in the era of the natural. As well ask to see the results of natural life, while the life was as yet only rooting itself in the inorganic period, as to ask for the glorious results of the spiritual life, while it is yet only rooting itself in the material period. "It doth not yet appear what we shall be," any more than it could appear what fullness of natural life should be, while only ferns and club mosses were struggling for a foothold on the earth.

This is the era of the natural, and we cannot even guess what the era of the supernatural

shall be. True to the old principle implanted in nature from the beginning, this highest form of life begins too, not in its own, but in the period next below; but it can flourish, only when that glad and propitious era shall be ushered in, which is correctly termed the era of the spiritual. If natural life flourished so luxuriantly, and blossomed so generously, and bore its fruit so abundantly in its own period, why shall we not expect that the spiritual life shall do the same, when its own period shall have arrived? We need only carry out the sweep of the arc, which we have seen this principle to make here in this visible world, to estimate what its direction will be there in the invisible world. A mathematician need to know only three points on a circle, to be able to tell where that circle shall strike at any other part. We have seen the curvature of this principle of life down here in this world; is any one so unscientific as to say that the circle stops, when it passes out of his sight? Is any one so little acquainted with natural laws as not to know what to expect from their action anywhere in the future, however remote? Life begins in one age but it flourishes in the next age. We have seen this to be true of natural life in general, and also to be true of

all the subdivisions of animal life as Dana's chart so clearly shows. But now, by our own experience, as well as from Revelation, we know that another and higher life has begun in man. Are we not compelled to acknowledge from the sweep of this law, first, that there will be another age succeeding this, and second, that this life shall flourish then, as it cannot now under these unpropitious conditions? From a scientific standpoint alone, we ought to know that if we have received this gift of a divine life, which comes by what is called the new birth, then there is a better period ahead, in which we shall know the blessed, and wonderful, and inexpressible results of this divine life, in that new, the divine era.

And now upon the creation as a whole, the divine commendation is pronounced—"and God saw everything that He had made, and behold it was very good." The great work of preparation had been completed, and the wonderful system of life had been begun, and all was very good. Part fitted to part; wheel cogged into wheel; the great fly wheel of universal motion, continuously impelled by the Spirit of God, was connected by invisible belts to all parts of creation; all forms of life were acting out their

function, and man himself had been created in the divine image and preparing to fill a divine part. It was complete, it was all well. Creative work was done; now another and higher work was to be entered upon; but this preparation for that higher work, received the divine approval—"it was very good."

CHAPTER IX.

SEVENTH CREATIVE DAY.

"*Thus the heavens and the earth were finished and all the host of them, and on the seventh day God ended his work which He had made; and he rested on the seventh day from all his work which he had made. And God blessed the seventh day and sanctified it, because that in it He had rested from all his work which God created and made.*"

The great work is finished, so far as the earth is concerned, for it is only of the earth and what has relation to the earth, that the record speaks. Again there would be a conflict, if we read the announcement absolutely, that all the host of heaven is finished, for Sir John Herschell, saw through his great telescope, what he thought was other systems, still going through the changes from nebula to settled planetary system, as ours had done. It is more than probable that creative work is still proceeding in other parts of the universe, but of this Moses is not speaking; his words refer entirely to what concerns our earth.

Three statements are made concerning the seventh day—on it God ended his creative work, on it He rested, and He sanctified it. That seventh day, is the present in which we are living; it is the modern or human era of geology; it was to be the period in which man is to replenish and subdue the earth, and with him, all the creatures that were serviceable to him, to the displacement and extinction of the ferocious and destructive animals, as so many species have been displaced and extinguished before. This fact, of cessation of all creative work, is fully corroborated by geology, for no new species have been known to have appeared since the creation of man; man is the last term in the ascending series of creations, according to science. No great geological changes have taken place during this period, for nature has entered upon her seventh day. There is no record of an evening and a morning, as in all the previous days, because the end of this day is not yet; when it shall end, "knoweth no man, no not the angels in heaven."

The stage is now completed, and all the scaffolding is taken down; the arena is now ready, in which man is to work out his eternal destiny, because for this, it was all along pre-

paring, and man enters at once into the possession of his dominion. All the powers of the world are to serve his use, all its animals are to help him build up the vast system, which might be called, not a christian but a heavenly civilization, which should be in itself and in its upbuilding, the great means of discipline to fit him for higher service, so that graduating from office in this dominion, he might be prepared for the thrones which await him in the higher kingdom, where he should be associated with the very Son of God, in His larger, divine dominion. For even Eden was not all; Eden was not the kingdom, but only the school to fit him for it.

Man is a free, moral being, who must make him self perfect, for even God cannot make him so; education can come only from discipline and even suffering, for not the power of the Almighty Himself can confer an education to such a being. Safeguards must be built for his character, but he must build them from within, as a mollusk builds his own shell about it. He must learn to exercise power, so that by and by, he shall be competent to rule angels, but he must learn this by exercising control first over self, then over animals, and then over the whole world. And all the means of preparation for this high destiny

were there in Eden; even the forbidden tree was not wanting, for by this he could learn that quality, most essential to a perfect moral agent, viz, obedience to the right. Perfection of moral character is not only to control, but also to be controled by the Right, the True, the Good. These are the gems of his crown, without which he cannot be king; but a king in the moral kingdom must make his own crown, as the lily crowns itself, from the qualities which are produced from its own bosom. That is the characteristic of a moral being, that he too becomes a creator; he creates his own robe of state—his beautiful character; makes his own sceptre of power—his knowledge; produces his own bejeweled crown—the divine qualities which blossom out of his godly heart. This dominion was given man, that he might have a sphere in which to practise as king, before he should be summoned to assume part in the mightier, more glorious kingdom of which Jesus is King, "for though He were a Son, yet learned He obedience, by the things which He suffered." This moral gymnasium, in which man was to practise royal and divine qualities, and so prepare to "go up higher," is all finished, and God rested from all his work, which he created and made.

We must not however conceive the childish thought that now God lay back exhausted with his week's work, and sleeps or rests as too many men rest on their Sabbath day. Creative work on earth is done, but now God's moral work begins. Said Jesus—"My Father worketh hitherto and I work," and this is no contradiction of Genesis. Rest, in the highest sense does not mean cessation from work, but change; a child really works harder in his play than he had worked at his study, but yet it is rest. This high work, on which the Creator now enters in the earth, is that which is so thoroughly congenial to his nature, that it is rest; engagement upon material things is *work*, upon moral things is *rest*, and into this condition Grace is to bring its subjects too. If man had remained as he was created, this seventh day to him also would have been a day of rest, "for he that is entered into his rest, he also hath ceased from his own works, as God did from his." There would have been no curse to him, no thorns and briars, no sweat of the brow, no hard struggle for daily bread, no bodily infirmity to make labor an exhausting weariness, no enmity between Satan and the seed of the woman, but the work would have been a delight and therefore a rest. Work

there would have been, for capacity for endless progress means necessity for endless work; glorious opportunity means earnest effort, necessarily.

What might have been! Had man exercised his divine quality of freedom under the divine law of obedience to Right—what might have been? But being a free moral being, he had the power of choice; he could obey Right or could disobey; he could not be deprived of the power of disobedience, and yet remain a free agent. Being in the image and likeness of God, he reached forth to claim what belongs only to God. "Ye shall be as gods," that was the temptation; he reached too far, lost his balance, and fell. And so God's great work was marred, and all his plans seemed to be foiled when they had just reached completion.

Here too, science corroborates revelation. It knows well that something is wrong in the world, but what it is, science cannot tell. There is a disease at the heart of things, but science is confined to the extremities of nature; it sees the irregular pulse beats, sees the fever flush the brow of nature, sees the extremities wither and die, but science knows nothing of nature's heart-disease. There is not a naturalist, however

skeptical he may be about revelation, but knows that man is out of harmony with nature, and most of all is out of harmony with himself. A great break has occurred somewhere; the wheels of the world go with a jar, as though a cog had been broken. There is a natural gravity toward wrong; something makes it easy to sin, but hard to do right; there is some force pulling downward as the moon pulls the tides. What is this disturbing cause?

From the perturbations of the planet Uranus, which could not be accounted for by any known cause, Leverrier was convinced that there must be another unknown planet outside the orbit of Uranus, to cause this disturbance. He made his calculations and wrote to his friend Dr. Galle in Berlin, to direct his large refracting telescope on a certain night at a spot in the heavens indicated, where he would probably find the undiscovered planet. Dr. Galle did as directed, and found it within one degree of the spot described. This discovery of Neptune from theoretical calculation, which required another planet, to account for the disturbing influence on Uranus, ranks among the most brilliant of the scientific feats of the present century. Likewise, there are great perturbations in the moral

realm; science realizes the fact, but she cannot point her telescope, so as to discover the disturbing influence.

And right there Revelation comes in to tell us the cause and its cure. Science fully corroborates Revelation in announcing the effect, but she stands reverently at the door with unshod feet, while Revelation enters into the sick chamber to remove the cause. If the watch is broken, only the watch-maker can repair it. If the main-spring of humanity is broken, no one but the Creator can make it good. Just here is disclosed the wonders of Redemption, which is a new moral Creation. It discloses the power which originally made, as once more, but now in Grace, willing to restore. Revelation comes to deal with a free moral being, and tells him how he may come to the great Maker, and have the injury repaired. But in this there must be a co-operation on the part of the man; he must be willing to come to the Creator, who has come down into flesh, in order to become accessible to men, so that man may be fully restored. But men must act upon their own freedom: this prerogative will never be invaded. Revelation can but invite, but it will not compel, for then man's moral quality, would be gone. It tells

them that it were vain for the broken being to attempt to repair itself; let him but come to the Creator and Repairer of humanity, and, all shall be made right. All this is beyond science; she can but give her assent to the facts, but can say nothing about the repairs, for the material creation alone is the domain of science, but this is a moral creation.

But all this was not so at the first; the seventh day was meant, not for repair, but for growth in the image of God, for moral development and spiritual culture. That purpose was frustrated by the entrance of sin, and by that entrance, the race has been set back a whole geological period. The millenium will be again, what Eden was when man lost it, but the whole time between Eden and the personal return of our Lord to finish his new creation, has been lost time, for it is all required to bring the race back again to the moral plane where God made it to begin.

"And God blessed the seventh day and sanctified it, because that in it He had rested from all his work which God created and made." Now that we cannot enter with the Creator into the enjoyment of his Sabbath rest, but must struggle with the weeds and groan under the curse, God

has given us a little Sabbath, commemorative of his own, and anticipative of the "rest which remaineth for the people of God." Six days of work, occupied creative week, and a seventh for rest; six days for the material, and one for the spiritual. The evening and the morning which intervened between the creative days, were the periods of rest, and then the whole seventh day was also a day of rest; so the time between evening and morning is to be a period of daily rest for man, but he also needs a whole day in seven, in which he shall rest from all his work.

But this seventh day, unlike the daily rests, is to be sanctified, that is—set apart to a holy purpose. Therefore comes the command, "Remember the seventh day to keep it *holy*." Some think that this is only a Jewish regulation, from which we are free; but it will be seen that its basis is creation; "for in six days the Lord made heaven and earth, the sea and all that in them is, and rested the seventh day wherefore the Lord blessed the Sabbath day and hallowed it." If this be only a Jewish regulation, in which we have no part, then the heaven, the earth, the sea and all that in them is, must also belong to the Jews in which we have also no part, for the observance of the Sabbath is founded upon the

creation; then let us turn over to the Jews, what we have taken from them, for to them belongs creation, if to them alone belongs the Sabbath.

A Sabbath rest is founded upon human nature, as well as upon creation, and the necessity of its observance is as wide as creation and the human race. Man's physical being requires this seventh day rest; less will not satisfy the body, more will not furnish him daily bread. During the French Revolution of 1779, when lawlessness ran riot, divine as well as human government was to be overthrown; it was enacted that the Sabbath should be abolished, but that a tenth day should be observed for rest. For three years they attempted to observe this statute, but, atheistic as the Government was, it was compelled to exscind it from the statute book and re-establish the seventh day rest once more, because the necessities of man and beast required it.

Six days man shall use, as God did, in work upon material things carrying the world up to a higher plane of progress, but the seventh must be employed for the nobler purpose of the soul And let the same principle pervade man's days of work as pervaded God's. From the time when cosmical matter lay dark and quiescent,

waiting to be quickened by the Spirit of God, up to the time when creation was crowned by a creature made in the likeness of God, there was orderly advancement and progress. So in all man's days of work, let there be advancement toward a better civilization, let there be a more complete subjugation of all nature's powers, and a more complete use of them toward reaching that high ideal of the condition of the race which is known as millenium; let there be progress in man's own condition, physically, socially, intellectually; let the fields yield better harvests, the garden more beautiful flowers, the city be more wholesome and healthy, and teem with all the conveniences; let the home be enriched with all that can sweeten and refine with means of happiness. Six days of every week are to be devoted to improvement in everything, as were the six creative days; they are to be given to "replenish and subdue the earth."

Replenish the earth with everything that will make it brighter and better; fill it with all that will tend to make it a happy home for the sons of God. Subdue it until its wild and untamed powers, like so many untrained colts, shall all become docile and serviceable to man. The lightning frolics in the air, seize it and subdue it; steam

and explosives rupture the earth with volcanic destruction; seize them boldly and subdue them, they will make mighty agencies for good; light colors the rainbow and glorifies the cloud, how it would glorify man's own life! subdue it to human purposes; the winds rave wildly over the seas, the tides waste their immense energy, subdue them and turn them into practical use. Give six days to these useful purposes to replenish the earth and fill it again with beauty and verdure, to bring all the wasted powers of nature into complete subjection for the benefit of man. This is a noble use in which to spend six days of every week; "but the seventh day is the Sabbath of the Lord thy God; in it thou shalt not do any work." The use to be made of the Sabbath day, is as necessary to the welfare of man as that of the six days. The individual or the nation which disobeys this command of God is simply bent upon its own ruin. Says divine Wisdom—"he that sinneth against Me, wrongeth his own soul."

But how is the Sabbath to be sanctified? Just as God sanctified it, by resting from all his secular work and entering upon a higher work, the spiritual and moral. This seventh, is God's day of redemption. Whatever will subserve

one's own or other's redemption, sanctifies the Sabbath. It is to be given exclusively to the spiritual welfare, and rigorously protected from all secular encroachments. The immortal part of man must not be robbed by the material and perishable part. He who uses the six days of the week wholly in the interests of the body, and then uses the seventh simply for the resting of the body, so that it can give itself again exclusively and more vigorously to the acquisition of material things, robs the prince to pay the slave; he subordinates the immortal to the temporal, he beggars eternity for the enrichment of time.

At the end of his creative work "God saw everything that He had made, and behold it was very good." The contemplation of his finished work, was the joy of his Sabbath rest. Let man so spend his six days, that the review of them will give satisfaction on the seventh. The use of the seventh day, which God commanded, will fit men for that eternal Sabbath of rest which will open the new week of heaven, that will never end. No evening or morning closes up the seventh day of creation; there will be no close to the eternal Sabbath, when "the new heavens and the new earth wherein dwelleth

righteousness" shall have opened the blessed era for man; and for this, all the previous days are to be a preparation, as all God's six days were a preparation to the seventh.

CHAPTER X.

METHOD OF CREATION.

Revelation, whether in the Bible or in Nature, is written, not in the language of science but in the language of appearances, for in no other way could it be understood in any age by the mass of men. All men can see that "the heavens declare the glory of God and the firmament showeth his handiwork," but that glory is disclosed in the language of appearances. The earth appears to be the center of the universe and the heavenly bodies to revolve around it; the sun appears to rise and set; the moon appears to be larger than any of the fixed stars; the planets appear to be only stars like all the rest of the heavenly bodies. And so in Revelation, creation appears to have been accomplished in six natural days; it appears to have been done by God's simple word of power; the sun and moon appear to come into existence on the fourth day. But all appearances need to be translated. To the child, looking down the railroad track, the rails

appear to approach each other, the farther they recede; the window pane, through which the house on the opposite side of the street can be seen, appears to be larger than the house, for how else could the one be seen through the other? Does then Revelation, does Nature, does Observation teach us falsely? No, they do not teach us falsely; their language of appearances must be interpreted for us by correct science. Now the only teacher to explain to us what Revelation says about nature, is science; for God never does for us what we can do for ourselves. We have accepted the explanation of the first chapter of Genesis as given by science, and the record then becomes luminous; science has established the inspiration of that chapter as it has never before been established. But now one more interpretation remains to be given, viz, the method of creation; if we are to know how God did it, science alone can explain.

We have seen that in the case of original matter, of the introduction of life, and of the endowment of man with a moral nature, a special word is used—"bara;" but all the other acts described by a peculiar and invariable phrase—"and God said, let there be." To matter, to which vibratory motion had been imparted by

the Spirit, God said—let there be light; to the clouds which held vast seas in their bosoms, God said—let there be a firmament; to the waters God said—let the waters bring forth abundantly; to the earth, God said—let the earth bring forth cattle. In each instance, God spake to what had been already created, and commanded it to co operate with Him, to bring forth something else; God did not create alone, nor did nature bring forth alone, but the record declares that in each case both were co-operating causes. The different things and species of life, were not created off-hand by an immediate act of God; of course He could have done so, but He did not choose to create in that way; His method was regular, orderly and always by means of natural causes; He gave nature a new power, and in each case this became a secondary cause. God speaks, not to Himself, but to that secondary cause, and by means of this, each separate act of creation is produced; in the case of man, however, He speaks to Himself—"let us make man in our image after our likeness" for here the creation is immediate, and without any secondary cause.

These are the data which the record gives us as to the method of creation; now for the in-

terpretation, we must come to science, for it is not the object of scripture to reveal what we may ourselves discover, and it would have permanently enfeebled the mind of the race, if the stimulus of research had been rendered unnecessary. This is the last office we shall ask science to render in the interpretation of the first chapter of Genesis. Astronomy, geology, biology have explained the rest of it. Once more we will ask science to explain and tell us the method of creation.

But from our knowledge of the history of the past, we shall expect that this last interpretation will also be met by violent opposition and frightened protest. When science explained the record by transferring the center of the planetary system from the earth to the sun, its words were scouted and its advocates were persecuted; does not the Bible say that the sun rises and sets? does it not say that God laid the foundations of the earth? Galileo is an atheist, if he assert the contrary. When science explained that the world was sustained, not directly by the finger of God, but by the power of gravitation, again the opposition was great, for it seemed that then God would be removed from the course of nature. When science explained that the antiquity of

the earth exceeded 6,000 years, again it was violently assailed, because it contradicted the Bible. And when science established the fact that man has lived upon the earth, much longer than was supposed by deducing a chronology from the Bible, again the opposition was up in arms. But truth must prevail; and afterward it was found that the authority and credibility of the Bible were in no wise impeached, but were rendered more secure than ever.

This opposition to whoever or whatever approaches our citadel of Truth, is proper and natural. No one must come within our defense except he can give the password and comes as a friend; we shall firmly hold to the old, until the new has proven itself better. Our education, traditions, and beliefs held from childhood, are very dear and will not easily be given up. So that when science once more comes to perform the part of interpreter and tell us how God created, it will be hard for us to give up our hereditary beliefs, and science will again be resisted. But if this last interpretation be thoroughly established in truth, we shall find that our dear old Book will not suffer here, any more than it did in the other instances when science took from men their false views, and gave them true ones.

It is not the Book which needs to be corrected, but our interpretation of it.

What is God's method of action now? Science finds that God does not now accomplish results directly, but always by the use of means; there is always a natural cause to produce a certain effect, as well as a divine cause. We do not now see species created, but we see that individuals are always produced by evolution from previous material. The seed, by means of the powers with which God has endowed it, developes into the root, the stalk, the leaf, and finally the fruit. From the egg is evolved the embryo, the chick, and then the air-breathing fowl. A man becomes what he is by a slow process of evolution from a microscopic spherule of protoplasm, and yet this does not in the least interfere with our belief that God made him. Individuals, everywhere and always have been created by evolution; as at the first, so still, God speaks to co-operating natural causes and says—let there be, and there is; it is God working, but never alone; He contributes the power, but that other cause uses it.

This is God's method of working in all those instances where we can follow Him, and the question is, did He use a different method in

those instances where we cannot follow Him? This is His way of producing individuals, did He have a different way of producing species? His method has always been from the lower to the higher; from the simple to the more complex; to previous material He imparted a new power, and this material thus endowed, then became the cause to produce the next higher, as explained in the record. When life came forth, God gave to each form the power of reproduction—"after his kind;" but does that mean, that kind shall be no better than before? If the parent is coarse, does reproduction "after his kind," mean that the offspring shall be equally as coarse? if rude and ugly, the offspring shall be the same? If this were the law of reproduction, there could be no improvement. Under better conditions improvement is possible, and still reproduction is "after his kind." If under this law there is a possibility for improvement for present individuals, why could there not have been such possibility of improvement for individuals of long ago, yes as far back as you wish to carry thought? If that were so, it would be hard to find first individuals, for the creation of life would be, as the record tells us, was the creation in the first three days. We could not

tell when light began to be, for it was slowly evolved from vibrating matter, we could not tell when the firmament began to be, for the expanse was slowly evolved from the cloud; we could not tell when dry land began to be, because the top of earth's wrinkles would appear above the water and the next moment be overflowed again; now it would be above the tide, and now be beneath the tide. Now if this same method of evolution which prevailed on the first three creative days, prevailed also during the last three days, then all individuals which are now conveniently classed together to form species began alike, viz, by a slow process of evolution. In the first three days of creation, the phrase—"and God said—let there be," science has explained, mean that God made nature a co-operating cause, and these two causes, the supernatural and the natural, produced all the results. In the last three days, where the record tells of life, we find the same phrase, but does it mean there the reverse of what it meant before? There it meant that God produced light, firmament, dry land by means of a co-operating cause; here can the same phrase mean that God produced vegetation and animals, through all the ascending grades, without a cooperating cause?

In the first half of creation God adopted one method, but in the second half did He adopt another, when both methods are described by the same phrase? This would make Him the God of confusion, a changeable God.

But it is time to ask—what is evolution? This is a word of such bad associations, that it still is dreaded, as a child dreads a chamber which she has been told was haunted, even after she knows there are no ghosts. "Evolution is the divine method of creation, as gravitation is the divine method of sustentation." God supports worlds in space, not by holding them on his fingers, but by tying them to each other by the cables of gravity; so God creates worlds, not by moulding with his own fingers, but by working through natural causes. This is theistic evolution, which differs from materialistic evolution, as theistic philosophy differs from materialistic philosophy. It will not do to deny theistic evolution, any more than it will do to deny theistic science. Of course there are atheistic scientists, agnostic scientists and deistic scientists; but we must not therefore conclude that science cannot be theistic. There are too many Christian men, who believe in a personal God, a divine revelation, the divinity of Jesus Christ,

the personality of the Holy Spirit, the efficacy of prayer, but who yet believe in the creation of the world after the manner of evolution; there are too many of these sincere, and evangelical believers, for any one to brand evolution with the mark of Cain, and turn it out of the household of faith.

Three views of the creation of man have been held; the first is that of the pious child who believes that God made it of dust, just as itself makes a man out of snow. The second is that of Topsey, who says—"I wasn't made, specs I growed;" this is the view of the materialist, who believes that God had no hand in the making of us. The third is the view of the christian evolutionist, who says—God made me, and I growed too; God and nature co-operated in my creation. All christians believe that the latter is true of known individuals, and theistic evolutionists believe it was also true of all individuals first, last or middle. That there was a first man and woman, all christians believe, for it was a single man into whose nostrils God breathed the breath of life, so that man became a living soul; but that the body of that first man was immediately formed out of the dust of the ground, as the child makes its snow man, the evolution-

ist does not believe. "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life, and man became a living soul." But when did God form man of the dust of the ground? Was it the very moment before He breathed into him the breath of life? Did He form man immediately of dust, when all else He formed mediately? Was it necessarily unorganized dust which He then took up and shaped into a human form? God formed my body of the dust of the ground too, but He did not form it in that way; it was by a long process and that not directly, but through other co-operating causes. Why should it be thought strange that He formed the first body into which He then breathed the breath of divine life, just as He has continued to form all other bodies of the dust of the ground. The record does not tell us of the method, but has left it to science to come and interpret the ways of God in creation, by the study of the ways of God in preservation, which is but another name of continued creation.

The difference in the belief of an evolutionist and a direct creationist, is not whether it was God who created or not, but simply as to the method of his creation. The latter believes that

God alone created each species directly, and without any intermediate causes, while the former believes that God proceeds in all his work according to the same universal method; as He creates individuals now, so He created the whole race, by means of lower and co-operating causes. Theistic evolution is as christian and scriptural in its views, as is direct-creation; one interprets God as adopting the same method in all his works, the other interprets Him as adopting two methods, one for the first pair of individuals, and the other method for all other individuals. Geology finds that whole species have been exterminated and new ones have taken their place; species have changed many times in the course of geological ages, but how did they change? Evolutionists say—they were transmuted; direct creationists say—they were replaced. The one class say—as conditions of life change, the species change too, so as to correspond with the new environment; those which did not change had to die, but those which changed to meet the new conditions lived, and so what we call new species came into being. But the other class of interpreters say—as one species died out, others were created at once and off-hand to take their place. The one say, God and Nature constantly

and consistently co-operate together to create, as well as to sustain; the other say—life is continued on earth by the alternation of supernatural and natural processes, now by the direct and now by the indirect action of God; in the introduction of the first pairs, God acted directly, but in the introduction of all subsequent pairs, God acted indirectly. The one say—God has but one method of operation in creating new species as in perpetuating them, and in replacing old ones with new; the other say—God has two methods of operation, and resorts now to one method and now to the other method, and again to the first, and then again to the second. The difference therefore is only as to method, not as to fact.

The agency of God in evolution may be illustrated by the use of the word—manufacture. Etymologically, the word means, hand-made, and originally it was applicable. The flax was sowed by hand, was reaped, hatcheled, spun, and woven by hand, and the product was literally a *manufacture.* But now this product is made altogether by machinery; the seed is sown by machinery, reaped, cleaned, spun, and woven by machinery entirely, and still we call it a manufacture. But is the agency of man eliminated

by machinery, because linen is not now literally a manufacture? Man stands now one remove back from the result, but is the result any the less his? Does not the machinery, by which such results are secured, prove the agency of man all the more, even though the result is not now first-hand? Says Le Conte—"Evolution not only, is not identical with materialism, but to deep thinkers it has not added a feather's weight to the probability or reasonableness of materialism. Evolution is one thing, materialism is quite another thing; now and always, there has been the alternative—theism or materialism, God operating nature, or nature operating itself." Says Dr. McCosh, ex-President of Princeton College—"There is, or was a widespread idea that the doctrine of development is adverse to religion; this has risen mainly from the circumstance that it seems to remove God altogether, or at least to a greater distance from his works, and this has been increased by the circumstance that the theory has been turned to atheistic purposes. But it must be emphatically declared that we are to look on evolution, simply as the method by which God works. It is forgotten that when Newton proclaimed the law of gravitation, it was urged that he thereby took from

God an important part of his works, to hand it over to material mechanism. The time has now come when people must judge of a supposed scientific theory, not from the faith or unbelief of the discoverer, but from the evidence in its behalf. They will find that whatever is true is also good, and will in the end be favorable to religion. Because God executes his purposes by agents, which it should be observed, He has himself appointed, we are not therefore to argue that He does not continue to act, that He does not now act. God acts in his works now, quite as much as He did in their original creation. The effects follow, the product is evolved, because He wills it, just as plants generate only when there is light shining on them. I am not prepared to prove that evolution is the best way in which God could have proceeded, or that there are no other ways equally good in which He acts in other worlds. All that I profess to do, is to show that the method is not unworthy of God; that it is suited to man's nature; that it accomplishes some good end. It is to this extent that I would justify the way of God to man."

But suppose now that evolution shall become as thoroughly established as is gravitation, what will become of the record of Moses? This

chapter is not written to argue the cause of evolution, but to state in the most incomplete way, some of the grounds on which this view is based, and to show that still there will be no conflict between Revelation and Science, for the record in first chapter of Genesis can easily bear the interpretation which evolution would put upon it. Indeed the frequent expression "and God said—let be" seems to require evolution, for it implies that God did not create immediately, but through co-operating causes; that at the beginning as now, many influences conspired to produce the results. There is the evolution of Lamarck which is materialistic; that of Darwin which is agnostic, and that of McCosh, Le Conte, Wright and many other christian thinkers, which is theistic. If evolution is true, it must prevail, but still our old Book cannot suffer; it will but shine out with new and better meaning, and its divine inspiration will be more firmly established than before. Evolution itself has not yet been completely evolved; the final word has not been said in its defense, indeed hardly more than its first word. Until it has been completely wrought out, or completely overthrown, believers in the Bible can wait with perfect calmness, indifferent which side shall

be victorious, for only the true can survive, and the true is in perfect agreement with Revelation.

CHAPTER XI.

ANTIQUITY OF MAN.

How long has the human race existed on the earth? Upon this answer, too, there has been supposed to be an irreconcilable conflict between Revelation and Science. Man has lived 5509 years before Christ according to the Byzantine era; 5199 years according to Eusebius and Bede; 4004 years according to Archbishop Ussher; 3984 according to Kepler. On the contrary, the uniformitarian school of geologists, under the lead of Sir Charles Lyell, dated the origin of life upon the globe back to a period of five hundred million of years, though the last, or human period, would of course be far less. In his first edition of the "Origin of species," Darwin estimates the time for certain erosions to have taken place as 306,662,400 years, and this he regards as "a mere trifle" which can be allowed for establishing his theory of the origin of species through natural selection. How much of these vast periods would be assigned to the human

period, we do not know, but very much more than that assigned by those who deduce their estimates from Scripture. In his "Antiquity of Man," Lyell estimates the human period at no less than 224,000 years, and adds "the advent of man in Europe would be sufficiently remote to cause the historical period to appear quite insignificant in duration, when compared to the antiquity of the human race." So that there would certainly be a wide difference between the estimates of Biblical and scientific chronologists, and here we should have an irreconcilable conflict if both parties read their texts correctly.

But again, as always, such a conflict is caused by misreading the Bible on the one side, and Geology on the other. Astronomy has now taken up the question, and shown the estimates of the earlier geologists to be greatly in error, for Sir. Wm. Thompson, and Prof. Tait of England, and Prof. Newcombe of Washington Naval Observatory, have demonstrated that the radiation of heat from the sun is diminishing at such a rate, that ten or twelve millions of years ago, it must have been so hot upon the earth's surface as to vaporize all the water, and thus render the beginning of geological life impossible until a much later period. Mr. Wallace, estimating

the time required for the deposition of the stratified rocks, that are open to inspection on the surface of the globe, finds that twenty-eight million years are all the time required for the formation of the whole geological strata, and of course the beginning of life, must have been far within that period. Mr. Prestwich and others, bring all the phenomena of the Glacial period within the limits of thirty or forty thousand years, but the human era did not begin until near the close of the Ice Age. These general conclusions of later science, have thus very much restricted the extravagant claims of those who based their estimates on the insufficient data of earlier geology. In this way, science is herself lessening the gap which was supposed at first to exist between its conclusions, and those based on the records of Genesis.

On the other hand, a deeper study of scripture has shown, that the choronology which was based upon the supposition, that the genealogies of the fifth and eleventh chapters of Genesis were successive, is built upon sand. The problem seemed very simple; here are two tables of genealogy, one extending from Adam to Noah, the other from Shem, the son of Noah, down to Abraham. They each contain ten generations, in which, is

given in the case of each individual the age when his son was born, and how long he lived afterward. Now all that needs to be done seems to be, to add these amounts together, and we shall have a scripture chronology, from Adam to Abraham, at which period authentic history dawns, when we can arrive at chronology from other sources. These results would be perfectly satisfactory, if we were sure that the Bible intended to teach the science of chronology, while we agreed at the outset that its purpose was not to teach science at all.

In an elaborate article in Bibliotheca Sacra for April 1890, Prof. Green of Princeton Theologial Seminary says—"There is an element of uncertainty in a computation of time which rests upon genealogies, as the sacred chronology so largely does. Who is to certify to us, that the ante-diluvian and ante-Abrahamic genealogies have not been condensed in the same manner as have the post-Abrahamic? Our current chronology is based upon the prima facie impression of these genealogies. But if the recently discovered indications of the antiquity of man shall, when carefully inspected and thoroughly weighed, demonstrate all that any have imagined they might demonstrate, what then?

They will simply show that the popular chronology is based upon a wrong interpretation, and that a select and partial register of ante-Abrahamic names, has been mistaken for a complete one." Prof. Green then shows that these chapters of Genesis were not intended to be used, and cannot be used for the construction of a chronology. Bible genealogies are frequently abreviated by the omission of unimportant names; abridgement is the rule and not the exception. The intention seems to be, not so much to give a complete register, but rather the line of descent, by mentioning a few principal names, as in Matt. 1;1 the whole genealogy of Christ is summed up in two steps, "the generation of Jesus Christ, the son of David, the son of Abraham." But Christ was not the immediate son of David, nor was David the immediate son of Abraham. From verse 2 follows a more lengthy line of descent from Abraham down, in which we know that several names have also been omitted; they seem to have served as way-marks to indicate the road of descent, and not all the steps in it.

In 1 Chron. 26;24 we read, in a list of appointments made by King David, that "Shebuel, the son of Ghershom, the son of Moses was ruler

of the treasures;" here the genealogy of five hundred years is reduced to two names. The genealogy of Ezra is given in the book which bears his name; but in another passage, in which the same line of descent is given, it has been abridged by the omission of six consecutive names. In Ezra 8;1, 2 we read—"These are now the chief of their fathers, and this is the genealogy of them that went up with me from Babylon in the reign of Artaxerxes the king. Of the sons of Phineas-Gershom; of the sons of Ithamar-Daniel; of the sons of David-Hut-tush." If no abridgement of the genealogy be allowed, we should have a great-grand son, and a grand son of Aaron, and a son of David coming up with Ezra from Babylon, an event which took place at least nine hundred years after the birth of the first two, and five hundred years after the last mentioned. The line of descent of Gershom, Daniel and Hattush could only have been intended, and not their complete genealogy. Many other instances might be given to show that there is great abridgement in the genealogical lists, by the omission of unimportant names, because space would not permit of a full register, which was kept in another place. The idea of the Hebrew word, translated

—son, would be better expressed to us by being translated—descendant, as in Matt. 1;1 "Jesus Christ, the descendant of David, the descendant of Abraham."

But to make the period of time from the creation of man to the birth of Christ, just 4004 years, it is necessary to suppose that Gen. 5 and 11 contain full registers of all the generations that intervened. In each case there are only ten names given, and that fact alone would lead us to suspect that the author did not mean to give a full register, for it is quite improbable that there were exactly the same number of generations between the creation and the Flood, as were between the Flood and Abraham. It is much more likely that the author selected ten names of representative men, simply to indicate the line from Adam to Noah, and from Shem to Abraham. The analogy of Scripture is against the assumption that here a complete register is given; the series seems to afford us a conspectus of individual lives. They exhibit, in these selected examples, the term of human life in those two periods—what it was before the Flood, and how it narrowed down after. But to do this, a continuous genealogy was not necessary, but only a number of specimens, the

same in both periods, with the appropriate numbers attached. But to base a chronology upon these specimen lists of ten each, and learn therefrom how long Adam lived before the Flood, and how long Abraham lived after, would use the record in a way that it was not intended to be used, and would certainly bring us in error. And then, if we insist that this chronology is based upon Scripture, so that the Bible becomes responsible for it, we bring on another conflict, when it is proved from scientific data, that man did live longer than 4004 years before Christ. Dr. Green concludes "that the Scriptures furnish no data for a chronological computation prior to the life of Abraham, and the Mosaic records do not fix, and were not intended to fix the precise date either of the Flood or of the creation of the world."

So that from the Scripture side, we also approach the position of science, and lessen the gap which seemed at first to be fixed between the two. So far as the Bible is concerned, it neither contradicts nor affirms any reasonable age of man upon the earth.

Historical evidence requires a longer period for man, than that usually assigned in the generally accepted chronology. The Egyptologists

Mariette and Brugsch find high civilization on the banks of the Nile seven thousand years ago; they would make the civilization of Assyria on the Euphrates as old. Considering the length of time for the languages of these and other peoples then living, to have differentiated so much as to make them totally distinct tongues, though derived from the same stock, a conservative estimate would require perhaps three thousand years more, if we believe in the unity of the race.

We find language is still changing, so that the Romanse languages of Southern Europe, Italian, Spanish, Portuguese, though derived from the same stock, are wholly different now. It requires a certain time for language to change so completely as to drift entirely away from another, which has come from the same source. Here are the Assyrian and Egyptian tongues, so completely changed from each other seven thousand years ago, yet both came from the original stock; a large allowance must therefore be allowed for this change to have taken place. Ten thousand years for the age of man on the earth would not be too great to satisfy historical demands.

But we have more exact time measures of the

age of man on earth in geology. The earliest evidence of man is found at the close of the Glacial Period, in the Post Tertiary. It was not very long ago, as geology counts time, that a large portion of North America and of Europe were covered by an ice sheet, like that which still covers the interior of Greenland. As Robinson Crusoe, knew by the footprints, that there was another human being beside himself on the sand, so geologists can follow the course of the glaciers, by the abundant prints which they have left in the moraines of debris, in the isolated boulders that have been carried by the ice far from the place where such rocks alone appear on the surface, in grooves ploughed by the moving ice, and the parallel scratches which the advancing mass has written on the stones. From these and other evidences of glacial work, we know that four million square miles in this country, and two millions in Europe have been covered by an ice sheet at least a mile in thickness.

The southern boundary of the glaciated area ran across our continent from the eastern end of Long Island, through New Jersey a little north of Trenton, thence north westerly to a point near Buffalo, thence south west through the Ohio valley to Cincinnati, throwing a great

tongue down the Mississippi far into Louisiana, and from Cairo north westerly through middle Dakota and Montana, and thence to the Pacific coast.

Vast quantities of water poured forth from this melting ice, and as the mass began to retreat under the influence of a rising temperature, the water often dug out new channels, when the old river beds had been filled in; or finding itself dammed up, it made new lakes, and pouring forth in great freshets, it carried vast amounts of sand and gravel which it deposited in embankments or spread over new areas.

The first evidence of the existence of man on the earth is in connection with the retreat of this ice sheet; human remains and stone implements are first found buried beneath these glacial deposits of earth and gravel. The first discovery of human relics clearly connected with glacial desposits in America and of the same age with them, was not until 1875; up to that time the age of man could be connected with the Glacial Period, only by the discovered fossils of animals which were known to be contemporaneous with him. So that the very earliest time when we can know positively that man existed, was not earlier than the close of the Ice-age. If now,

we can determine when these glacial deposits were made, we shall have some definite data by which to estimate the length of the human period.

We have such self-registering chronometers in some of the rivers which are known to have begun since the ice disappeared. It will be noted that the water-falls of this continent are north of the southern boundary of the Ice sheet, and the reason is very plain; those rivers which were pre-glacial have had time sufficient to wear away their channels down to the level, and any falls which might formerly have existed, have long since been eroded, while post-glacial streams have not yet had the time to finish their work. Many of the lakes, which dot the glaciated area, are also due to the fact that their outlets have not had time enough to lower their beds, sufficiently to drain off the water. Lake Erie is one of those post glacial lakes, formed by the damming up of the river which formerly ran through a channel at its bottom, and which found its outlet through the lower part of the valley of Grand River in Canada, and entered Lake Ontario at its western extremity. Lake Michigan in pre-glacial times had its outlet to the south and emptied into the Mississippi.

The old outlet of Erie river becoming closed by the debris deposited by the ice sheet on its recession, the water found itself dammed up, and rose to form the present Lake Erie, which then had to find a new outlet that finally became the Niagara river, which is wholly a post-glacial stream. All who have visited Niagara, will remember that the water, after leaping over the falls, rushes through a deep gorge, that has been cut through solid rock, until it reaches Lewiston, about eight miles below. This rock gorge of the Niagara, therefore is an accurate chronometer by which to measure the time that has elapsed since the retreat of the ice, because it has been entirely cut by the action of the water, since that time. All that is necessary, is to ascertain the rate of recession of the falls, the distance from Lewiston to its present position, and divide the latter by the former, when the quotient will give us the length of time that this post-glacial stream has continued to flow. We find that the falls are slowly wearing backward, and when Sir Charles Lyell visited Niagara with State Geologist Hall in 1841, they estimated that the rate of recession could not be greater than one foot a year, which would make the time required about thirty-five thousand years. Yet

Lyell thought this rate of recession was probably three times too large, so that he favored extending the time to one hundred thousand years. Before this, the eminent French geologist Desor, had estimated that the recession could not have been more than a foot a century, which would throw the beginning of the gorge back more than three million years. But these were only guesses of eminent men, that were not based on well ascertained facts. Soon after, Prof. Hall had a trigonometrical survey made of the falls; since then, three other surveys have been made, from which it is found that the rate of recession has been about two and a half feet per year for the last forty-five years. But in the central parts of the curve, where the water is deepest, the Horseshoe Fall has retreated at the rate of more than twenty feet per year, during the last eleven years. If now, we suppose that the falls have been worn backward at a uniform rate since the Niagara river first began to flow, the whole period cannot be more than seven thousand years. But there are evidences to show that the waters of Lake Erie did not immediately begin their work of cutting a channel through the Niagara, so that a longer period must be allowed since the foot of the ice sheet melted

away from that region. Prof. Wright estimates that three thousand years more, will fully cover all the conditions, so that the close of the glacial period cannot be more distant than about ten thousand years.

A second noteworthy glacial chronometer is found in the gorge of the Mississippi River, extending from the Falls of St. Anthony, at Minneapolis, to its junction with the pre-glacial trough of the old Mississippi, at Fort Snelling, a distance of about seven miles. The known rate of recession of the falls, would give the total length of time required for the formation of the gorge, of a little less than eight thousand years, or about the same as that required for the formation of the Niagara gorge. The same impression of recent age is made by examination of the outlets of almost any of the lakes which stud the glaciated area; the time during which this process of lowering the outlets has been going on, cannot have been many thousand years. The same impression is also made by the study of the vallies that have been dug out by post-glacial streams. The streams constantly carry away the earth from their banks and bottoms and tend to enlarge their troughs. If we measure the cubical contents of these eroded troughs,

and divide the amount by the average amount of transported sediment which they carry every year to the sea, we shall have again nearly the same results obtained from the study of the recession of post-glacial water-falls. Calculations based upon the amount of sediment deposited since the retreat of the ice-sheet point to a like moderate conclusion.

From these and similar investigations, that have been carried on since geology has been able to ascertain rigid facts, upon which to base its estimates, science has very much modified its conclusions, which in former years it had so hastily made, especially under the lead of men, who would very much like to bring the Bible into discredit. For while, we have found that estimates of time based upon genealogical lists, which it is clearly seen could not have been meant to be complete, must be incorrect, yet the study of the Bible certainly gives the impression that the human period upon the earth has not been long. While the extension of the time to ten or even twelve thousand years, if science should require so much, would spoil the fancies of many theorists, who like to build airy castles out of the Bible, yet such an amount of time would not at all

conflict with anything that the Bible itself has to say, for the reason that it says simply nothing at all. The ten selected names of men who lived before the Flood, which seem to have been given to show the length of human life then, and the ten selected from those who lived after, in whose time human life had greatly narrowed —these would not prohibit our supposing ten times ten generations in both periods, if it were necessary, so that there certainly cannot be made a conflict between Revelation and Science on the length of the human period, because Revelation declines to say anything, but leaves this to her sister and interpreter to determine, while she herself hastens to speak of more important things of which science can tell us nothing.

Again the two have approached each other. The wide chasm which seemed to yawn between them has entirely disappeared, because scientists now acknowledge that they mis-read nature in making the human period too great; and Bible students acknowledge that they mis-read the inspired record when they made the human period too small. If we assign from seven to ten thousand years to the human period both revelation and science will not withhold their consent.

CHAPTER XII.

CONCLUSION

"The word of the Lord is tried," says the Psalmist; through the centuries it has been tested, so that it comes into our hands with an authentication which it did not bring to the generations before us. There are four great and rigorous tests to which it has been subjected, out of which it has come with a vast increase of authority. The first test which the Bible has successfully passed is—time. Nothing but truth lasts; everything materiable is perishable. "The everlasting mountains" is only a figure of speech, for geology shows that the mountains change and pass away. But of all things, the most perishable are the creation of men; literature is ephemeral and lasts but for a day. Of the three millions of volumes in the library of Paris, only a few thousand are what may be said to be alive, while the vast numbers are buried in the dust of oblivion, and are mouldy with neglect. But contrary to the universal law, time has but

polished the Bible as the ceaseless waves polish the pebbles, and it is to-day brighter and more resplendent than it has been in all the thirty-five centuries of its existence. It has never been so universally studied, never so widely circulated, and never so generally accepted as now. Time has tested it and proved it true.

The second great test by which the Bible has been tried is—experience. "Are these things so?" men ask. The answer is—"Come and see." "O, taste and see; "Handle me and see!" Like a ready reference volume of medical practice for home use, the Bible makes certain prescriptions for the ills of human life, the correctness of which can be proved only by experience. It promises relief from the sense of guilt and deliverance from the power of sin; it offers perfect peace and fullness of joy; it professes to have a secret by which life can be lived under unfavorable conditions, and yet can be serene and happy; it claims to be able to tell us how perfect mastery may be obtained over self, victory over temptation, and power over the world; it furnishes an equipment for service, so that one who tried it, exclaimed—"I can do all things through Christ which strengtheneth me;" it professes to open a means of communication between God and

man by prayer, so that our requests may be known unto Him, and direct answers shall come to us; it tells of divine help for human infirmities by an indwelling Spirit, so that a new life shall result, and divine fruits shall be produced; it promises that all things shall be so directed that individual sanctification shall follow, and men shall be more and more delivered from the evil, and made meet for the inheritance of the saints in light. It promises much more than this, but all of these are practical and can be experienced in this life; these are as much within the range of experiment as anything material and visible. Multitudes of men have accepted the Bible's challenge to "taste and see;" they have complied with the necessary conditions, and their universal testimony is that in all these respects, it is true.

But just here, men who are not themselves willing to comply with the prescribed conditions, yet complain that the testimony of christians is not trustworthy, because that testimony does not agree with their own experience: they have not themselves found it so. But just as well might laymen refuse the testimony of a chemical expert, who declares that water is composed of two parts of hydrogen and one part of oxygen. Ah, but

argues the objector, hydrogen and oxygen are gases, whereas water is not a gas but a fluid; your testimony contradicts my experience. The answer is—your experience has not been under proper conditions.

On all other points which are to be established by testimony, we rely most upon the testimony of experts. If the subject be the effect of medicine, we ask for the testimony of medical experts; if it be electrical, we require the testimony of electrical experts. Why then should we not most rely upon the testimony of spiritual experts, where the subject is a spiritual one? These matters of which the Bible mostly speaks are spiritual; if we seek for proof of its trustworthiness, we should ask, not of those who have had no experience in the matter, but of those whose experience has been so large that they may be called spiritual experts. There are thousands of these now in the world; millions have already passed away, who have put the Bible to a practical test on these spiritual things, and they unanimously testify that it is true.

The third test is history. Here too the Bible is more and more vindicated; as ancient history, archæology, ethnology, the study of comparative languages, lay their results before us, we find

this record more abundantly confirmed. Many a statement of the Bible has been rejected as untrue by historical students in the past, and has been adduced as proof of its error, but it has now been completely confirmed, as ancient monuments have been exhumed, rolls and tablets have been deciphered, historic places have been unearthed, and mummies have come forth from their long forgotten tombs with scrolls in their withered hands. Numerous and wonderful instances could be cited, if this were the proper place. The vigorous test to which history has subjected the Book, has only the more clearly disclosed its truthfulness.

And the fourth test is that produced by modern science. This is a search light which could be thrown upon the "word of the Lord" only in these last days. Geology is a comparatively new science; biology is still in its infancy; ethnology, archæology, cosmogony, comparative languages and religions are all of the last few decades. But as this electric light is turned on the dark places of the Bible, these do not prove to be caverns whence superstition drew myth and fable, but they are found to be deep mines, where are found rare and beautiful jewels. And as the sun rises higher in our intellectual

heavens, the fog banks are rolled back, and what seemed frowning and hostile battlements, where revelation was entrenched on the one side and science on the other, are now seen to be parts of the same great mountain mass of truth, touched and gilded by the light of heaven. The mercy of the Bible and the truth of science have met together; they have looked each other in the face and found that they were daughters of the same great Father; the righteousness brought in the hand of the Bible, and the peace brought in the hand of science, have kissed each other.

No longer with the jealousy and petulance of ignorance, keeping each her own book to herself, Revelation and Science now, like two loving and beautiful sisters, sit down together, and study their books together, and ask each other's aid. Revelation turns over the leaves of the Bible and asks Science to help interpret its teachings to men; and Science turns over the rocky leaves of Nature, and when she has deciphered the hieroglyphics which the divine finger has written upon them, she is surprised and rejoices, when revelation shows that they are but pictured illustrations of the same truths contained in the written word.

By time, by experience, by history, by science, the Word of the Lord has been tried, and the results have been for its confirmation. But the work is not yet all done. There remain more difficulties to be explained, more seeming conflicts to be harmonized. If we shall not see it all accomplished in our day, we will not withhold our faith. So much has been done already, that we cannot but expect that the good work will go on; more light will break forth from the written word, and more light will break forth from the material word of God. But all light, from whatever source is one. The results thus far are all in the same direction, and we cannot but believe that they will continue in that same direction for all future time. "Lord, I believe, help Thou mine unbelief." Upon the truth of the written word of the Lord, we are willing to build our hope for eternity, and we "know that we shall not be ashamed."

THE END.

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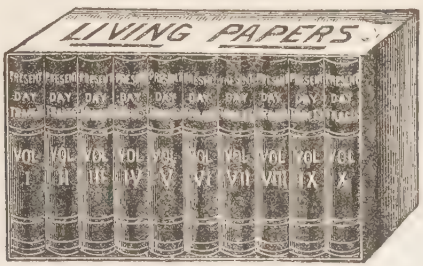

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